

Series 6495
TROVIS 6495-2 Industrial Controller



Mounting and Operating Instructions

EB 6495-2 EN

Firmware version 1.11 to 1.21
Edition February 2015

Note concerning these Mounting and Operating Instructions

The documentation for the TROVIS 6495-2 Industrial Controller consists of the Mounting and Operating Instructions EB 6495-2 EN and the Configuration Manual KH 6495-2 EN.

These instructions EB 6495-2 EN describe the installation, electrical wiring and operation of the controller. In addition, these instructions include a list of all configuration settings and simplified block diagrams of each control mode.

The Configuration Manual KH 6495-2 EN describes the controller's functions in detail. The control modes are explained using examples of applications. Additionally, the Configuration Manual include a list of the most important Modbus datapoints. This Manual can be downloaded from the SAMSON website.

Definitions of the signal words used in these instructions

 **DANGER!**
indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Note: *Supplementary explanations, information and tips*

NOTICE
indicates a property damage message.

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1 Important safety instructions

For your own safety, follow these instructions concerning the mounting, start-up and operation of the industrial controller:

- ▶ The industrial controller may only be mounted, started up or operated by trained and experienced personnel familiar with the product.
According to these Mounting and Operating Instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible dangers due to their specialized training, their knowledge and experience as well as their knowledge of the relevant standards.
- ▶ The controller is intended for use in low-voltage installations.
For wiring and maintenance, you are required to observe the relevant safety regulations.

To avoid damage to any equipment, the following also applies:

- ▶ Proper shipping and appropriate storage are assumed.

2 Device version

2.1 Article code

Industrial Controller TROVIS 6495-2	x
Power supply	
85 to 264 V AC	1
24 V AC/DC	2

2.2 Accessories

Accessories	Order no.
TROVIS-VIEW Configuration and Operator Interface.....	6661
Infrared adapter (RS-232).....	8864-0900
Bracket for infrared adapter...	1400-9769
USB to RS 232 adapter.....	8812-2001
RS-232/USB interface board..	1400-9917
RS-485/USB interface board..	1400-9918
USB cable (2 m) with type A and 5-pin mini-B connectors...	8801-7301
Connecting cable RJ 12/D-sub 9-pin (RS-232)...	1400-7699
Memory pen (RS-232).....	1400-9753
Modular adapter RJ 12/D-sub 9-pin.....	1400-7698

Note: The TROVIS-VIEW software is a common operator interface for various smart SAMSON devices. The software together with a device-specific module allow the configuration and parameterization of the device.

The device-specific module for TROVIS 6495-2 can be downloaded free of charge from the SAMSON website (Services > Software > TROVIS-VIEW).

Additional information on TROVIS-VIEW (e.g. system requirements) can found on the SAMSON website and in the Data Sheet T 6661 EN.

3 Installation

The TROVIS 6495-2 Industrial Controller is designed for panel mounting. Its front case has the dimensions 96 x 96 mm.

NOTICE

When installing several TROVIS 6495-2 Industrial Controllers, the minimum distance between each controller as shown in Fig. 1 must be kept!

1. Prepare a panel cut-out with the dimensions $92+0.8 \times 92+0.8$ mm.
2. Push the industrial controller into the panel cut-out from the front.
3. Insert the two mounting clips in the notches on the top and bottom.
4. Turn the threaded rods in the direction of the control panel using a screw-driver, clamping the case against the control panel.

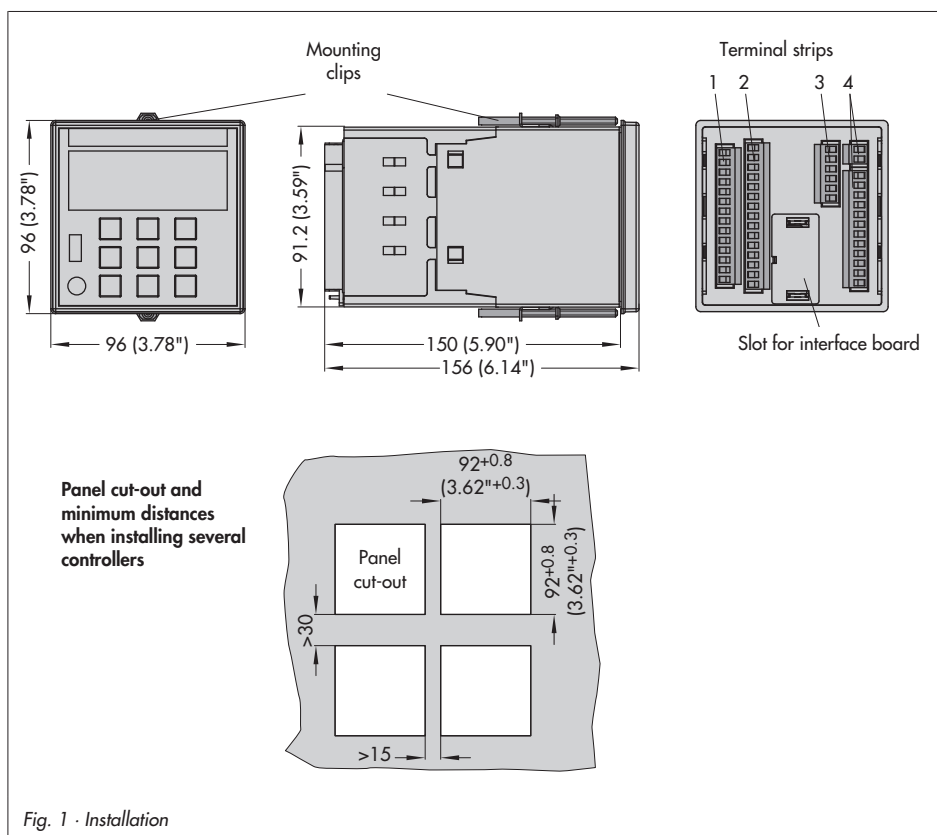


Fig. 1 · Installation

4 Electrical connection

Risk of electric shock!

When installing electric cables, you are required to observe the regulations governing electrical power plant installation in the country where the controller is to be installed.

Installation notes

- Install the power supply lines and the signal lines separately! Do not install them parallel to each other! To improve noise immunity, observe a minimum distance of 10 cm between the power line and the measuring input line. The lines for the digital signals (bus lines) as well as the analog signal lines (sensor lines, analog inputs and outputs) must also be routed using separate cables.
- To avoid measurement errors or other disturbances, use shielded cables for the analog and binary signal lines and bus lines. Ground the shield at one end, either at the controller inlet or at the control cabinet outlet, using the largest possible cross-section. Connect the central grounding point and the PE grounding conductor with a cable $\geq 10 \text{ mm}^2$ using the shortest route.
- Inductances in the control cabinet, e.g. contactor coils, are to be equipped with suitable interference suppressors (RC elements).
- Control cabinet elements with high field strength, e.g. transformers or frequency converters, are to be shielded with sepa-

rators providing a good ground connection.

The controller has screw terminals for 1.5 mm^2 wires (0.5 to 1.5 mm^2 wire cross-section).

The lines are connected to the terminal strips 1 to 4 as shown in the following connection diagrams 2a to 2c.

Transmitter supply

The controller has a supply output to power a maximum of four two-wire transmitters (21 V DC, 90 mA).

Resistance thermometer

The analog inputs AI1 to AI4 are designed for the connection of resistance thermometers Pt 100 and Pt 1000 in a three-wire circuit. The resistance of each connection lead must be the same and not exceed 15Ω . Lead calibration is not necessary.

Resistance thermometers can also be connected in two-wire circuits. In this case, connect a jumper between the controller terminals. Take into account that the lead resistance may reach several ohms over long distances, causing the measured value to be considerably distorted. This measured value can be balanced out using a correction value (configuration item I.1.4/I.2.4/I.3.4/I.4.4 Input signal increase/decrease, see section 14.2).

Potentiometer

The analog input AI2 is designed for the connection of a potentiometer with two-wire or three-wire connection. Potentiometers between 50 and 1200 Ω can be connected.

A potentiometer is used, for example for position feedback of an electrical actuator or for input of an external set point.

Generally, we recommend performing a user calibration. To perform a calibration, use the configuration items A.20.2.13 (zero) and A.20.2.14 (end), see section 11.

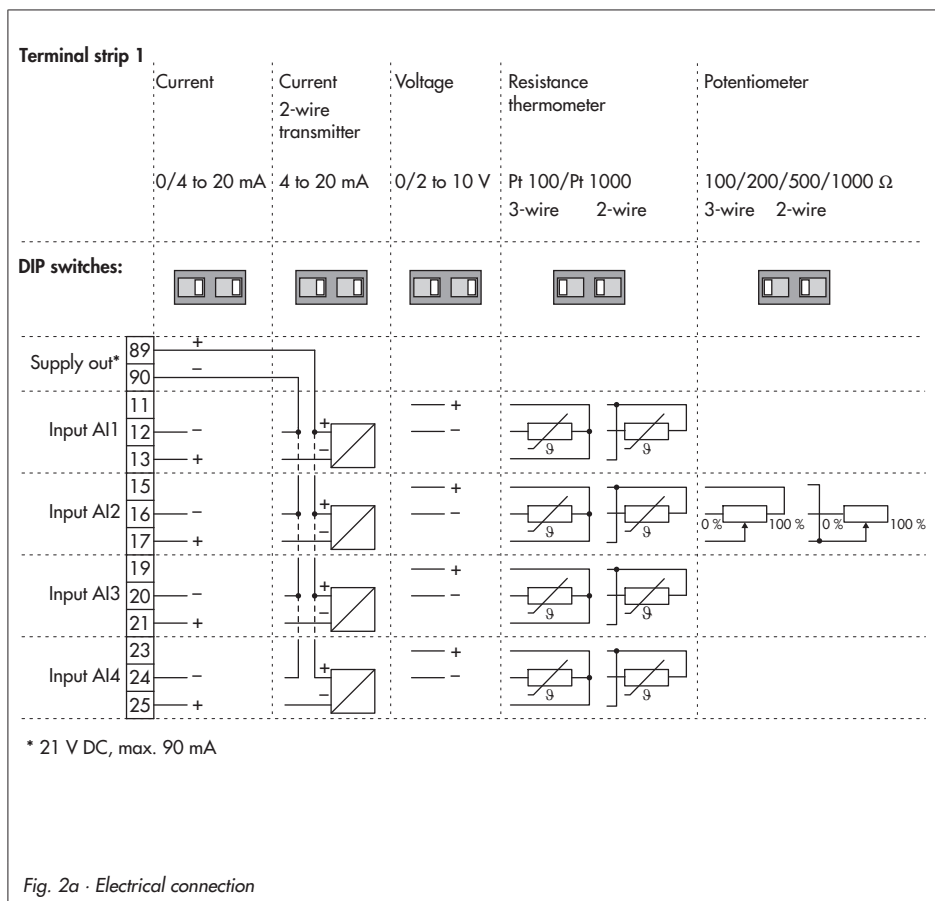
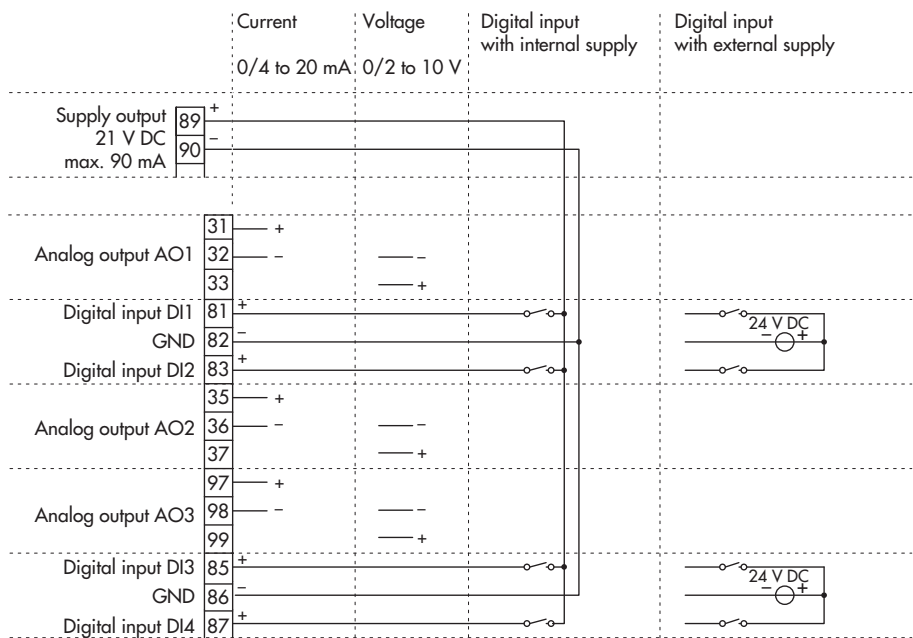
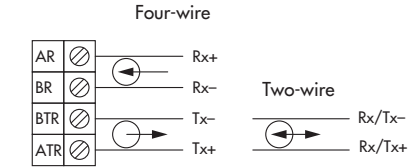


Fig. 2a · Electrical connection

Terminal strip 2



RS-485/USB interface (option, see section 13.2.2)



RS-232 interface (option, see section 13.2.1)

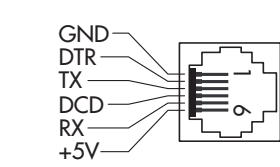
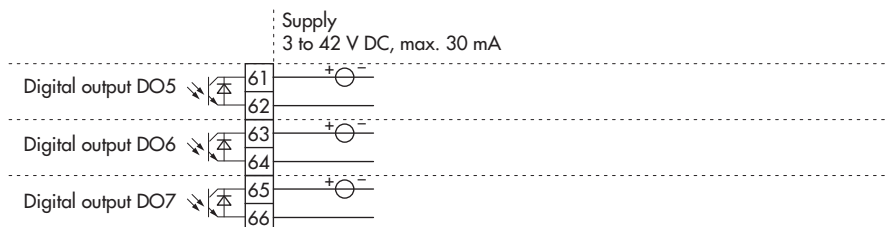


Fig. 2b · Electrical connection

Terminal strip 3



Terminal strip 4

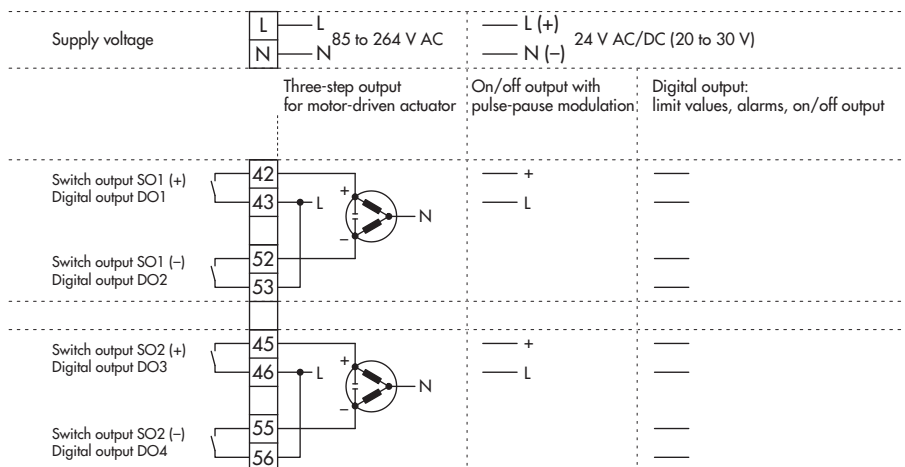


Fig. 2c · Electrical connection

5 Operation

5.1 Operation structure

The controller has the following operation levels:

Operating level (Fig. 3):

The controller is in this level while the controller is in operation. Key information on the control process are displayed in this level.

Info menu:

The info menu consists of several menu items containing information on the running process and the firmware version.

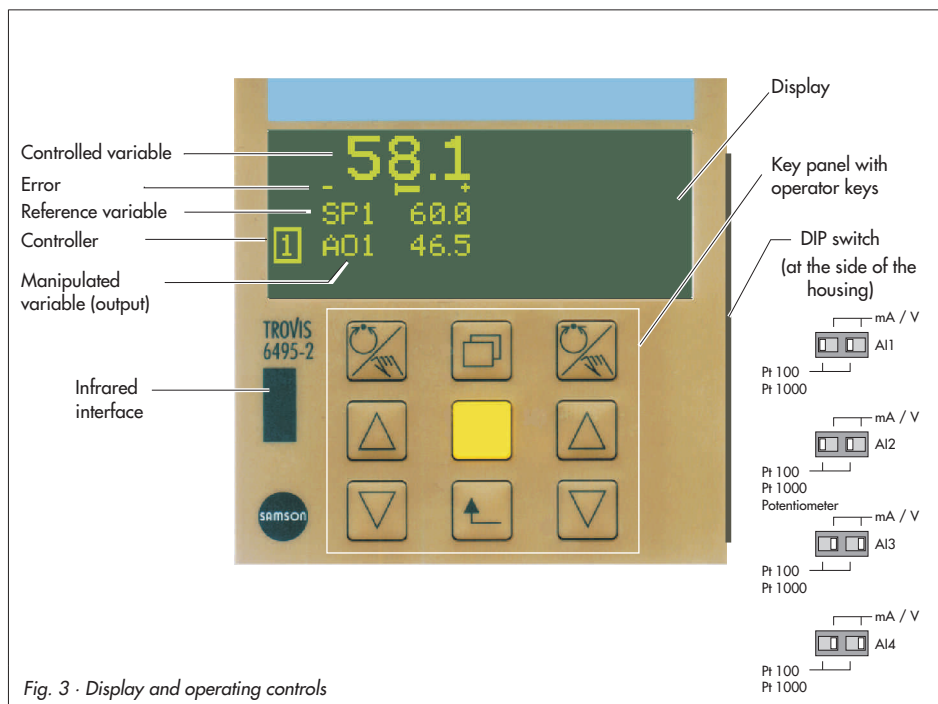
Operating menu:

The operating menu allows the control parameter and set points to be changed. These are located in two different menu items.

Configuration menu:

The controller is adapted to its control task by changing configuration items and parameters.

The configuration level is divided into menus and submenus. The submenus contain the individual configuration items and parameters.



5.2 Display and operator controls

Display

The controller is in the operating level while the controller is in operation.

The display is divided into two sections. Each section is assigned to one controller. The default assignment is as follows:

- ▶ Left display: Controller [1]
- ▶ Right display: Controller [2]

The controlled variable (actual value), error, set point and manipulated variable (output) are displayed for each controller in the default setting.

Status messages concerning the digital inputs and outputs can be displayed depending on the configuration. For control modes with just one controller, further signals can be displayed in five rows in the additional display.

Infrared interface

Data are transmitted between the controller and TROVIS-VIEW installed on the computer over the infrared interface of the controller and the infrared adapter (order no. 8864-0900) connected to the computer.

DIP switches

Before an analog input can be configured, the DIP switches must be set correspondingly. These switches are used to initially select whether an input is to accept a current/voltage signal (mA, V) or a resistance signal (Pt 100, Pt 1000, potentiometer).

To make the initial setting effective, both DIP switches of an analog input must have the same position. If just one DIP switch is switched, the last valid configuration of the input remains effective. An error message is generated and the digital output for error messages DO7 is activated. The fault alarm icon  is displayed in the operating level (see section 12).

Two DIP switches are assigned to each analog input AI1 to AI4.

- ▶ Both DIP switches on the right: Current signal (mA or V)
- ▶ Both DIP switches on the left: Resistance signal (Pt 100 or Pt 1000) or potentiometer (only with analog input AI2)

Key panel with operator keys

- ▶ Left and right row:
 -  Manual/automatic key
 -  Cursor key
 -  Cursor key
- ▶ Middle row:
 -  Info key
 -  Enter key
 -  Escape key

Note: A difference is only made between the keys on the left and right in the operating level. In this case, the keys on the left are used to operate the controller on the left display and the keys on the right are used to operate the controller on the right display.

The function of the keys varies depending on the level/menu which is active. See the table below.

Operator keys	Operating level	Info menu	Operating menu	Configuration level
 Manual/ automatic key	– Switch between manual and automatic control mode – Cascade control: Open/close controller cascade	– No function –	– No function –	– Edit individual items of parameters
 Cursor keys	– Automatic mode: Change set point – Manual mode: Change output value	– Browse through menu and information	– Browse through a menu – Change set point and control parameters	– Browse through menu, submenu, configuration items and parameters – Set configuration items and parameters
 Enter key	– Enter main menu (operating menu and configuration level)	– Enter menu items	– Confirm settings – Switch over set point	– Enter menu, submenu, configuration items and parameters – Confirm settings
 Info key	– Enter info menu	– No function –	– No function –	– No function –
 Escape key	– Confirm restart after supply voltage failure	– Return to the operating level stepwise	– Return to the operating level stepwise	– Return to the operating level stepwise

6 Operating level

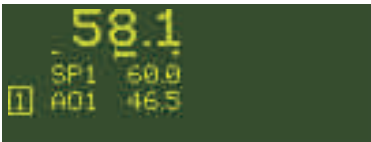
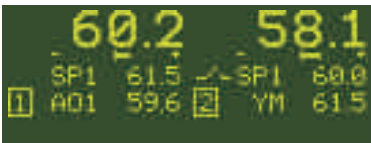
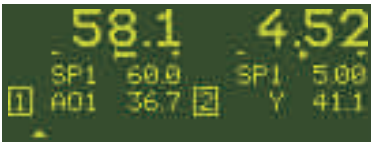
The operating level is active while the controller is in operation. Key information on the control process is displayed in this level.

Default reading on display:

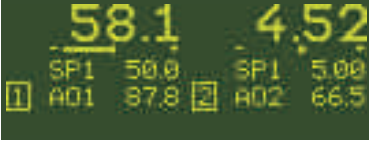
Row 1	Actual value PV0 at comparator
Row 2	Error signal +/-e
Row 3	Set point SP1 ... SP4, SPE, SPC
Row 4	Output according to priority

The display in the operating level is arranged depending on the control mode selected. For control modes with two controllers, the default display has two sections: Controller [1] on the left display section and Controller [2] on the right display section. See overview below.

Note: The default reading can be adapted as required. See section 9.3.

Overview: Default reading on display in the operating level for various control modes		
Control mode	Operating level (default reading)	
M.1-1 1x Fixed set point/follow-up control	Controller [1]	
M.1-2 Ratio control	Controller [1]	
M.1-3 Cascade control	Slave controller [1]	
M.1-4 Override control	Main controller [1]	

Overview: Default reading on display in the operating level for various control modes

Control mode	Operating level (default reading)	
M.1-5 Fixed set point/follow-up control	Controller [1] 	Controller [2]
M.1-6 Ratio controller and controller	Ratio controller [1] 	Controller [2]

To operate the controller, use the cursor keys (, ) and the manual/automatic key () in the operating level. These keys are located on the left and right of the key panel. Use the keys on the left to operate the controller shown in the left display section and use the keys on the right to operate the controller shown in the right display section.

The following actions can be performed in the operating level:

- ▶ Change the set point → section 6.1
- ▶ Switch over to manual mode and change the output → section 6.2
- ▶ Open/close cascade (only with cascade control (setting M.1-3)) → section 6.3

6.1 Changing the set point

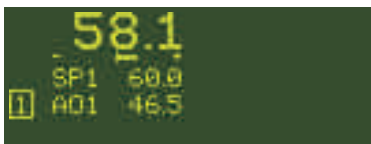
Change the set point in automatic mode using the cursor keys:

-  Increase the set point.
-  Decrease the set point.

Note: The last digit is changed by one value every time the key is pressed. Hold the key down to change the value at a faster rate.

6.2 Switching over to manual mode and changing the output

Note: The left display for Controller [1] is shown in the following examples. Consequently, the keys on the left are used for operation.



1x Switch to manual mode.



The hand icon appears above the controller designation [1]/[2].
The currently active manipulated variable (output) is highlighted:
AO1 = 46.5 %

... Increase the manipulated variable or

... Reduce the manipulated variable.

Note: The last digit is changed by one value every time the key is pressed. Hold the key down to change the value at a faster rate.

Return to automatic mode

1x Return to automatic mode.
The hand icon is no longer displayed.

6.3 Opening/closing cascade

The opening/closing cascade function is only possible for cascade control (setting M.1-3).

The cascade is opened and closed by pressing the manual/automatic key of the master controller [2].

Note: In the following example, the master controller [2] is shown on the right display (default). As a result, the manual/automatic key on the right is used to open/close the cascade.

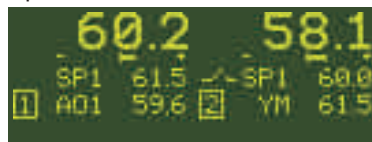
1x Close the cascade.



The cascade icon is no longer displayed when the cascade is closed.

The output value YM of the master controller [2] specifies the set point SPM of the slave controller [1]:
SPM = YM

1x Open the cascade.

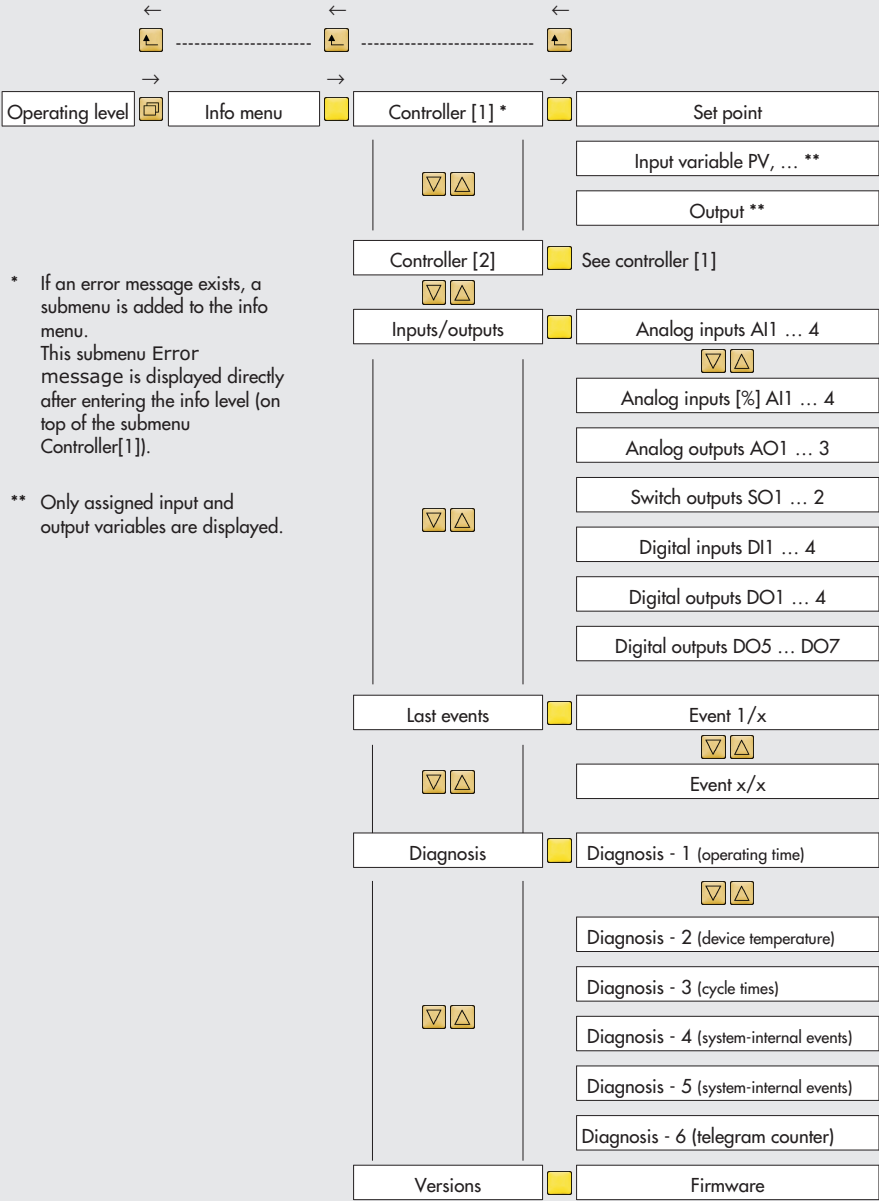


The cascade icon appears when the cascade is opened.

The set point of the slave controller [1] can be changed using the cursor keys (,).

The cascade can also be opened/closed over a digital input. See configuration item C.2.2.3 in section 14.2 and section C.2.2.3 in the Configuration Manual KH 6495-2 EN.

Info menu



* If an error message exists, a submenu is added to the info menu. This submenu Error message is displayed directly after entering the info level (on top of the submenu Controller[1]).

** Only assigned input and output variables are displayed.

7 Info menu

Information on the running process and the controller can be viewed in the info menu. Usually, there are the following menu items Controller [1], possibly Controller [2], Inputs/outputs, Last events, Diagnosis and Versions. If an error message exists, the menu item Error message is added to the info menu.

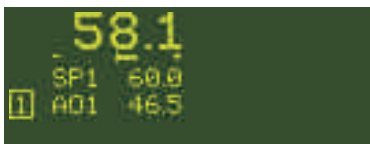
Enter the info menu by pressing the info key . Use the cursor keys (, ) to browse through the menu. Press the enter key  to select a menu item. Press the escape key  to return.

Note: Both the keys on the left and right in the key panel can be used for the info menu.

Example: A control mode with one controller is configured. An error message does not exist in the controller.

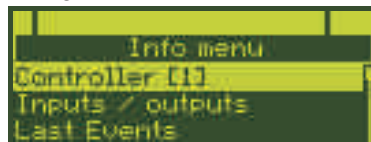
- The objective of the example is to find out the current values of analog inputs AI1 and AI2.

The controller is currently in the operating level:



Enter the info menu

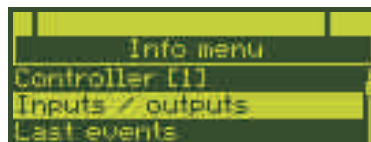
-  1x Change to the info menu.



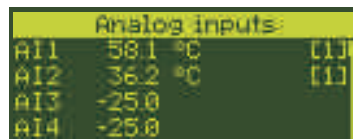
The menu item Controller [1] is highlighted on the display.

Activate analog input readings

-  1x Select menu item Inputs/outputs.



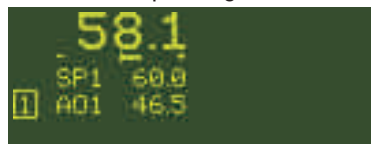
-  1x Activate menu item Inputs/outputs.



The analog inputs are displayed with their current values.

Return to the operating level

-  2x Return to the operating level.



Notes concerning the readings in the info menu

• Menu item Inputs/outputs

Directly after the digital inputs and outputs, the state of the input/output is indicated: (0) or (1)

In the case of a reversed digital input or output, the state of the input/output in reversed form is additionally indicated: inv.(1) or inv.(0)

Digital inputs			
D11	(0)	inv.(1)	[1;2]0]
D12	(0)		[1;0]X]
D13	(0)		
D14	(0)		

The controller assigned to the input/output is indicated on the right of the display ([1] or [2]) in the reading of analog inputs, digital inputs, analog outputs, switch outputs and digital outputs. If the input/output is assigned to both controllers, both controller numbers ([1; 2]) are indicated.

Additional readings apply to the digital inputs (separate or combined with the controller number):

- ▶ [O] indicates that the digital input is assigned to an output.
- ▶ [X] indicates that the digital input activates the key locking.

Digital outputs			
D01	(0)	inv.(1)	[1]
D02	(0)		[1;2]
D03	(0)		[0]
D04	(0)		[1]

Additional readings apply to the digital outputs (separate or combined with the controller number):

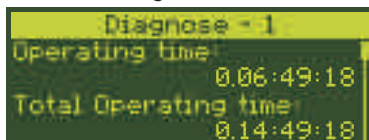
- ▶ [I] indicates that the digital output is activated by a digital input.
- ▶ [O] indicates that another digital output has been assigned as the source to the digital output.

• Menu item Last events

Event (1/49)	
002:02:23	
Event 0003	
Warm start	

Any events that occur are logged and time-stamped. The last event is always listed first.

- Menu item Diagnosis - 1



Operating time indicates the time the controller has been operating since the last start-up of the controller in days:hours:Minutes:Seconds.

The total operating time refers to how long the controller has been supplied with voltage (Days:Hours:Minutes:Seconds).

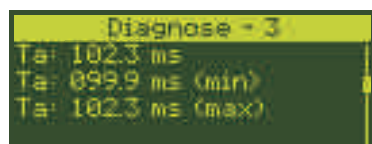
- Menu item Diagnosis - 2



When installing the controller, it is important to make sure that the permissible ambient temperature (0 to 50 °C) is kept.

The device inside temperature is monitored to protect the controller and to guarantee the measuring accuracy of the analog inputs. The measuring error at the analog inputs increases, the more the ambient temperature deviates from 20 °C. Refer to the technical data on page 56. If the temperature inside the controller falls below 0 °C or rises above 60 °C, a message is generated in Last events. If the temperature inside the controller falls below -5 °C or rises above 65 °C, a further message is generated in Last events and Error message and the fault alarm icon  blinks on the display. The digital output DO7 is activated.

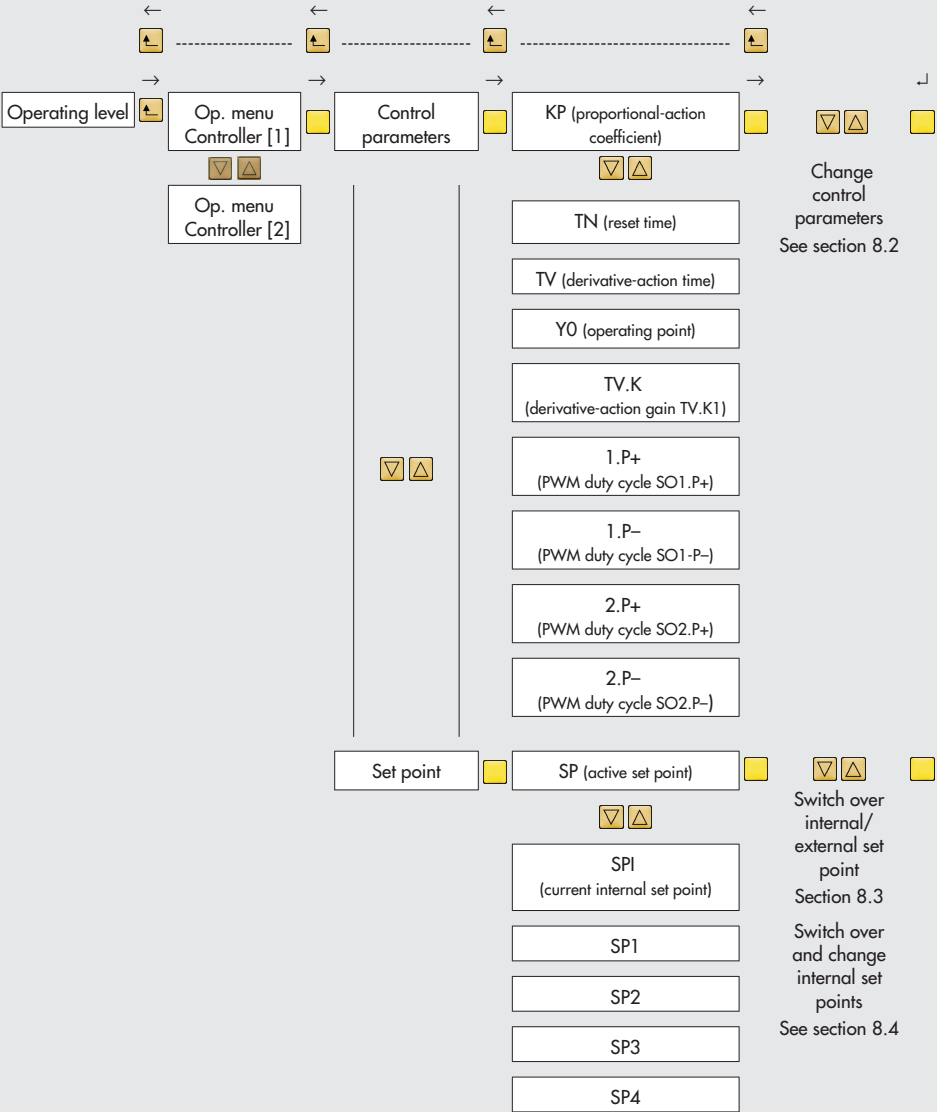
- Menu item Diagnosis - 3



Reading of current scanning time

The scanning time (min) can be reset by pressing the left manual/automatic key  and the scanning time (max) can be reset by pressing the right manual/automatic key .

Operating menu



8 Operating menu

The operating menu consists of the menu items Control parameters and Set point. The following actions can be performed:

- ▶ Change control parameters → Section 8.2
- ▶ Switch over internal/external set point → Section 8.3
- ▶ Switch over and change internal set points → Section 8.4

Press the enter key  to enter the operating menu. Use the cursor keys (, ) to browse through the menu. Press the enter key  to select a menu item.

Note: Both the keys on the left and right of the key panel can be used for the operating menu.

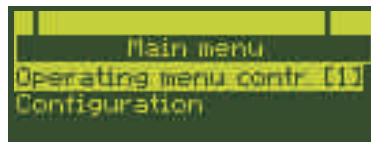
8.1 Entering the operating menu

The controller is currently in the operating level:



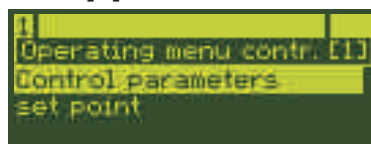
Enter the operating menu of Controller [1]

-  1x Switch to the main menu.



Operating menu contr. [1] is highlighted.

-  1x Enter Operating menu contr. [1].



The submenu Control parameters is highlighted.

Note: Enter the operating menu for Controller [2] in the same way after selecting it ().

8.2 Changing the control parameters

After activating the operating menu (see section 8.1), the control parameters are changed in the menu item Control parameters. Depending on the control behavior, the proportional-action coefficient KP, reset time TN, derivative-action time TV, derivative-action gain TV.K and operating point Y0 can be changed:

Assignment between control parameters and control behavior

C.3.1.1.1	PI	P	PD	PID	I
KP	•	•	•	•	•
TN	•	–	–	•	•
TV	–	–	•	•	–
Y0	•	•	•	•	•
TV.K	–	–	•	•	–

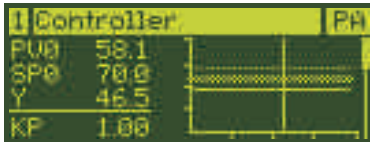
Note: If on-off/three-step outputs are configured with pulse width modulation (PWM), the corresponding duty cycles (SO1.P+, SO1.P–, SO2.P+, SO2.P–) can be changed.

Example: The reset time TN for Controller [1] is to be changed to 100 s.

- ▶ Enter the operating menu (see section 8.1).

Change the reset time TN

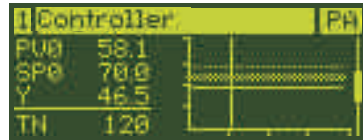
- 1x Activate the menu item Control parameters.



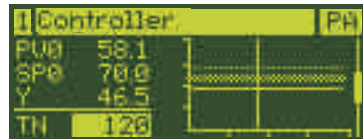
The actual value at the comparator PV0 (), the set point at the comparator SP0 () and the manipulated variable Y () are indicated on the left. For ratio control: Actual ratio PVR, ratio set point SPR and manipulated variable Y). Their course within the last minute in the 0

to 100 % range of the measuring range is plotted on the right. The current value of the proportional-action coefficient KP is indicated below.

- 1x Select reset time TN.

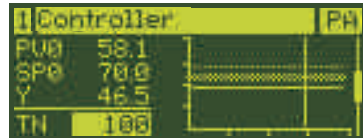


- 1x Activate reset time TN.



The current value of the reset time is highlighted: 120 s

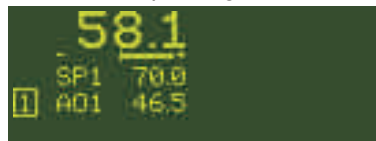
- ... Keep pressed and change the reset time TN to 100 s.



- 1x Confirm the reset time.

Return to the operating level

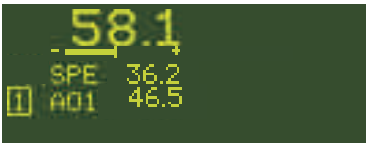
- 3x Return to the operating level.



8.3 Switching over internal/external set point

If the external set point SPE (C.2.1.2-1) is configured, the set point SP is equal to SPE. The switchover to an internal set point SPI is performed in the operating menu.

The controller is in the operating level:



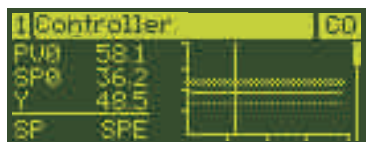
- Enter the operating menu (see section 8.1).

Switchover to the internal set point SPI

- ▼ 1x Select the menu item Set point.

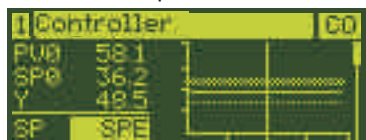


- 1x Activate the menu item Set point.



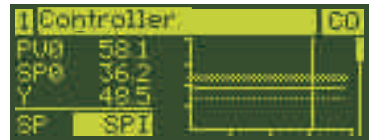
The current set point is displayed:
SP = SPE

- 1x Activate the set point SP.



The current set point is high-
lighted: SPE

- ▲ 1x Select internal set point SPI.



- 1x Confirm the setting
SPI is now the active set point.

Note: Determining and changing the internal set point is described in Section 8.4.

Cascade control

For cascade control (M.1-3) the cascade can also be opened and closed by switching over the set point.

The cascade is opened if the following applies in the slave controller [2]: SP = SPI
The cascade is closed if the following applies in the slave controller [2]: SP = SPM

8.4 Switching over between internal set points and changing them

In the operating menu, one of the set points SP1, SP2, SP3 or SP4 can be assigned to the internal set points SPI, depending on the configuration.

Required configuration for determining the set point

SP1	C.2.1.1-1/-2/-3/-4
SP2	C.2.1.1-2/-3/-4
SP3	C.2.1.1-3/-4
SP4	C.2.1.1-4

Example: The controller [1] has two internal set points SP1 and SP2 (configured with 1C.2.1.1-2).

- The set point SP1 is to be switched over to set point SP2.
- The set point SP1 is to be kept at 70 while the set point SP2 is to be changed to 100.

The controller is currently in the operating level:



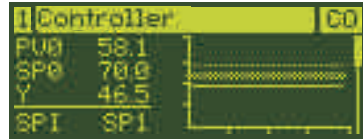
- Enter the operating menu (see section 8.1).

Switchover between internal set points

- ▼ 1x Select the menu item Set point.



- 1x Activate the menu item Set point



The actual value at the comparator PVO (■), the set point at the comparator SP0 (■) and the manipulated variable Y (■) are indicated on the left. For ratio control: Actual ratio PVR, ratio set point SPR and manipulated variable Y). Their course within the last minute in the 0 to 100 % range of the measuring range is plotted on the right. The assignment of the internal set point (in this case: SPI = SP1) is indicated below.

- 1x Activate the internal set point. The current internal set point is highlighted: SP1

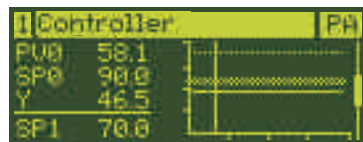
- ▼ 1x Set the internal set point SPI = SP2.



- 1x Confirm the setting SP2 is now the active set point.

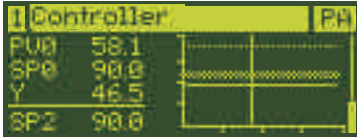
Change set points SP1 and SP2

- ▼ 1x Select the set point SP1.



The set point SP1 has the required value of 70.0 and therefore does not need to be changed.

- ▽ 1x Select the set point SP2.



- 1x Activate the set point setting SP2.
The current set point is highlighted: 90.0

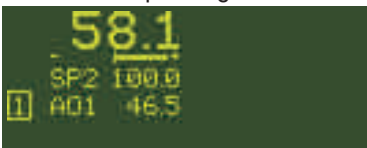
- △ ... Keep pressed and change the set point to 100.0.



- 1x Confirm the set point.
The set point is adopted.

Return to the operating level

- ⬆ 3x Return to the operating level.



Note: In firmware version 1.21 and higher, switchover to internal set points released with C.2.1.1 can be performed over Modbus with holding register 55 (Controller [1]) and 115 (Controller [2]). Refer to KH 6495-2 EN.

Value 1 = Set point SP1 active

Value 2 = Set point SP2 active

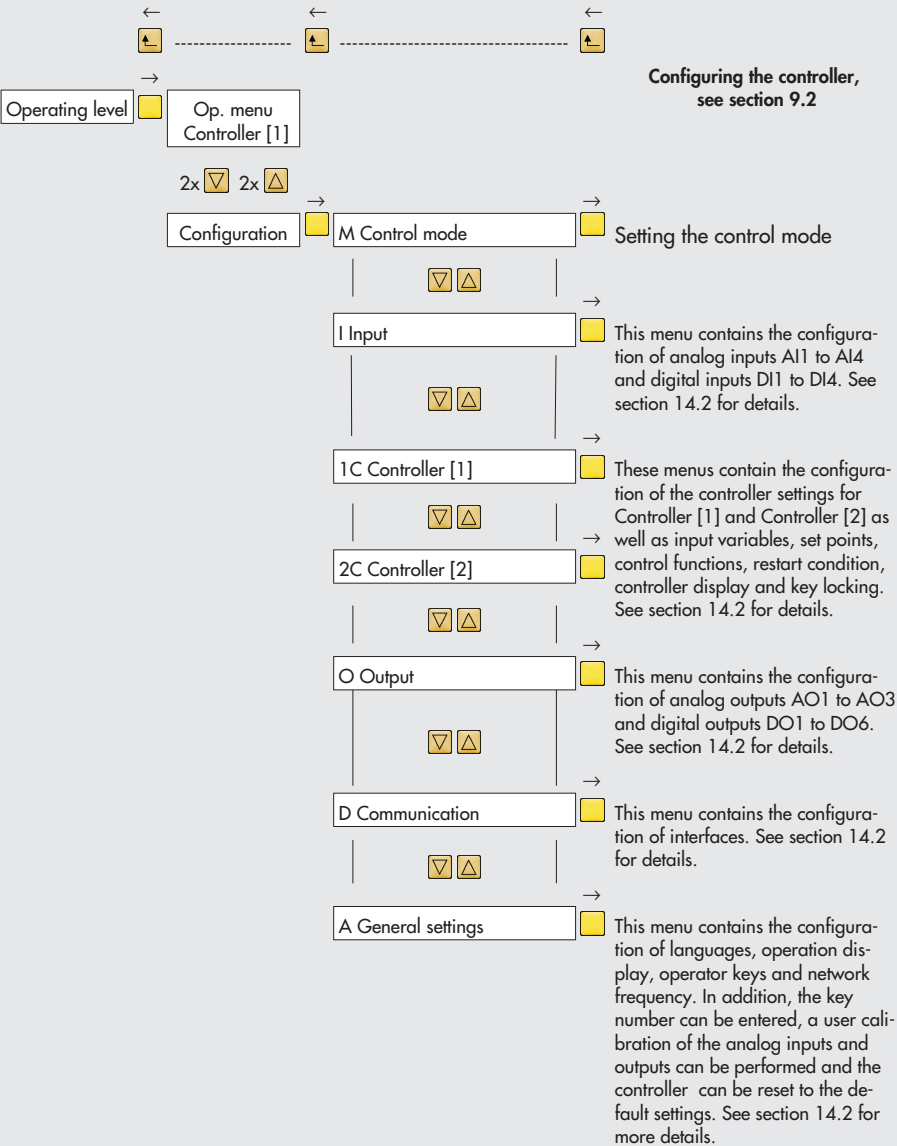
Value 3 = Set point SP3 active

Value 4 = Set point SP4 active

The switchover over Modbus has the same priority as switchover using the keys.

The set point switchover cannot be performed either using the keys or over Modbus if the set point switchover over the digital inputs is configured.

Configuration level



9 Configuration menu

In the configuration menu, the controller is adapted to its control task by changing individual configuration items and parameters. The configuration menu is subdivided into various menus and submenus. The submenus contain the individual configuration items and parameters. Section 14.2 includes an overview of all possible settings that can be made.

The Configuration Manual KH 6495-2 EN contains detailed descriptions on individual configuration items as well as other helpful information.

Operation within the configuration level is performed using the cursor keys, (, , enter key () and escape key ().

Note: Both the keys on the left and right of the key panel can be used in the configuration level.

If the controller is to be newly configured, we recommend keeping the following configuration sequence:

1. Set the control mode, e.g. M.1-1
2. Set the input, e.g. I.1.1-6
3. Assign input to controlled variable, e.g. C.1.1.1-1
4. Change the set point, e.g. C.2.1.1
5. Determine the control algorithm, e.g. C.3.1.1
6. Assign the output, e.g. O.1.1-1
7. Set the output signal, e.g. O.1.2-1

8. Set the operating direction, e.g. O.1.3-1

9. Set the restart condition, e.g. C.4.1-0
- Configuration Manual KH 6495-2 EN contains further information.

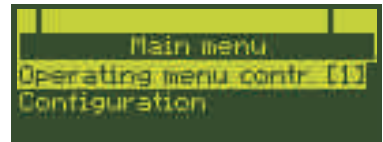
9.1 Entering the configuration level

The controller is currently in the operating level:



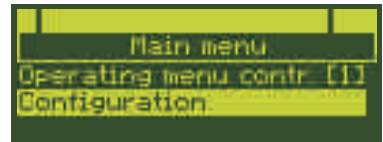
Enter the configuration level

-  1x Change to the main menu.

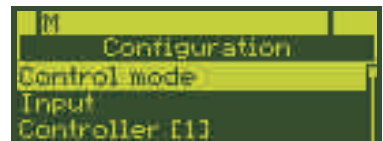


The Operating menu Contr. [1] is highlighted.

-  1x Select Configuration menu.



-  1x Enter Configuration menu.



The menu M Control mode is highlighted.

9.2 Configuring the controller

The controller is configured by setting the configuration items and associated parameters.

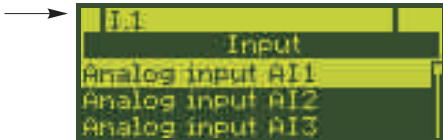
Each configuration item has its own code, which gives information on its position in the configuration level.

Example: The configuration item Input signal has the code I.1.1.

► I → Menu I Input



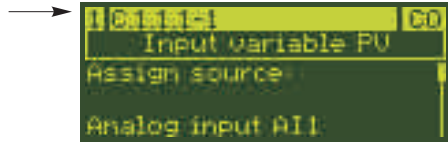
► I.1 → Submenu 1 Analog input AI1



► I.1.1 → Configuration item 1 Input signal with the setting -6 Pt 100



For control modes with two controllers, the controller number "1C..." (Controller [1]) and "2C..." (Controller [2]) is added to distinguish between the controllers, e.g. for



configuration item C.1.1.1 Input variable PV:

Note: Some configuration items as well as the parameters can only be set if certain settings have already been made in the controller configuration. The required settings for the controller configuration are described in the configuration list (section 14.2) and in the Configuration Manual KH 6495-2 EN.

9.2.1 Setting configuration items

1. Read the code of the configuration item that you want to change from the configuration list (section 14.2).
2. Find the position in the configuration level. See the example in section 9.2.2.

Select and set the configuration item

▼... If the configuration item that you want to set is not in the menu M Control mode, select the menu required:

- I Input
- C Controller [1]/[2]
- O Output
- D Communication
- A General settings

- 1x Enter menu.
The first submenu is highlighted.
- ▽... If the configuration item that you want to set is not in the highlighted submenu, select the required submenu.
- 1x Enter submenu.
The first configuration item of the submenu is displayed together with its current setting.

Note: The menu C Controller partly consists of two submenu levels. To view the individual configuration items, the submenus must be entered one after the other.

- ▽... If you want to set another configuration item or parameter other than the one displayed, select the required configuration item/parameter.
- 1x Activate configuration item/parameter.
- △ ▽ Change configuration item/parameter.
- 1x Confirm setting.

Return to the operating level

- ⬆... Return to the operating level stepwise.



9.2.2 Configuration example

Based on a default setting (1x Fixed set point/follow-up control M.1-1), the analog input AI1 is to be set to Pt 1000. The measuring range is to be 0 to 200 °C.

- ✓ The code of the configuration item to determine the input signal is I.1.1, see configuration list (section 14.2). Lower and upper range values are set in the AI1.MIN and AI1.MAX parameters. Both parameters are assigned to the configuration item I.1.1.
- ✓ The following position in the configuration level can be found using the code of the configuration item:
 - ▶ I → Menu I Input
 - ▶ I.1 → Submenu 1
Analog input AI1
 - ▶ I.1.1 → Configuration item 1
Input signal

Note: The analog input AI1 can only be configured as a Pt 1000 input when the DIP switches are positioned for "Pt 100/Pt 1000".

Both DIP switches AI1 (at the side of the controller case) must set to the position "Pt 100/Pt 1000" (see Fig. 3 on page 12).

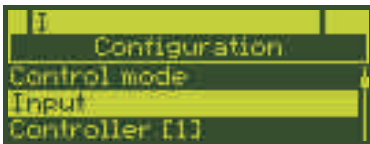
The controller is currently in the operating level:



- ▶ Enter the configuration level, see section 9.1.

Configure the input signal

- ▼ 1x Select menu I Input.

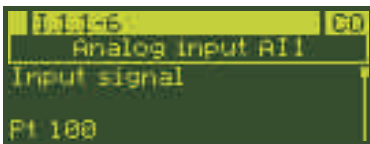


- 1x Enter menu I Input.



The submenu I.1 Analog input AI1 is highlighted.

- 1x Enter submenu I.1 Analog input AI1.



The configuration item I.1.1 Input signal is displayed together with the current setting: I.1.1-6 = Pt 100

- 1x Activate the configuration item I.1.1 Input signal.

The input signal setting is highlighted: Pt 100

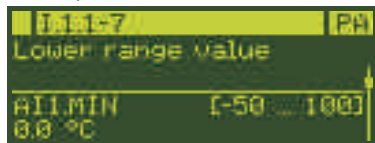
- ▼ 1x Change setting to I.1.1-7 (Pt 1000).



- 1x Confirm new setting.

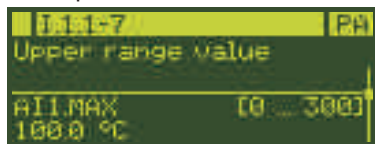
Set the measuring range

- ▼ 1x Select AI1.MIN Lower range value parameter.



The lower range value is already set to 0 °C and does not need to be changed.

- ▼ 1x Select AI1.MAX Upper range value parameter.



- 1x Activate AI1.MAX Upper range value parameter.

The upper range value setting is highlighted: 100.0 °C

- △ ... Keep pressed and change the upper range value to 200 °C.

- 1x Confirm new setting.

Return to the operating level

 4x Return to the operating level.



9.3 Adapting the display

The display can be adapted in the following ways:

- ▶ Change controller display → section 9.3.1
- ▶ Set up additional display → section 9.3.2
- ▶ Switch Controller [1] and Controller [2] displays → section 9.4

9.3.1 Changing the controller display

The controller display is adapted in the submenu C.5 Controller display of the corresponding Controller [1] or [2] (1C.5 or 2C.5).

Signals can be selected for each row which are to be displayed in the operating level.

The type of representation (numerical, bar graph, etc.) can additionally be determined for the rows 4 and 5.

The following table shows the settings necessary for adapting the display (see section 14.2 for details).

	Select signal	Select type of representation
Row 1	C.5.1-1...4	—
Row 2	C.5.2-1...2	—
Row 3	C.5.3-1...3	—
Row 4	C.5.4-1...41	C.5.5-1...6
Row 5	C.5.6-1...41	C.5.7-1...6

Example: Based on the default setting (1x fixed set point/follow-up controller M.1-1) the output AO1 for Controller [1] in row 5 is to be displayed as a bar graph.

According to the table above, the setting is made in menu 1C Controller [1] in the configuration items 1C.5.6 Row 5 and 1C.5.7 Row 5 representation.

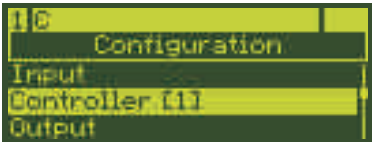
The controller is currently in the operating level:



- ▶ Enter the configuration level, see section 9.1.

Configure row 5

 2x Select menu 1C Controller [1].

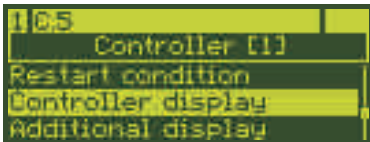


- 1x Enter menu 1C Controller [1].

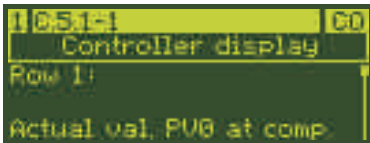


The submenu 1C.1 Input variables is highlighted.

- 4x Select submenu 1C.5 Controller display.

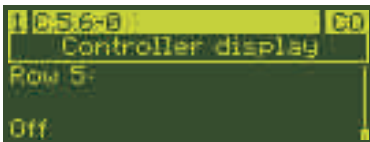


- 1x Enter submenu 1C.5 Controller display.



The configuration item 1C.5.1 Row 1 is displayed together with the current setting: 1C.5.1-1 = Actual value PVO at comparator

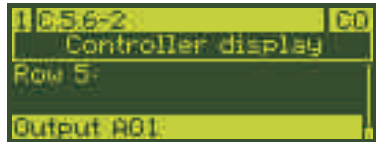
- 5x Select configuration item 1C.5.6 Row 5.



The currently active setting is displayed: 1C.5.6-0 = Off

- 1x Activate configuration item 1C.5.6. The currently active setting is highlighted: Off

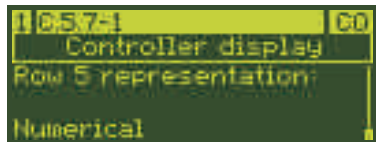
- 2x Change setting to 1C.5.6-2 (Output AO1).



- 1x Confirm setting.

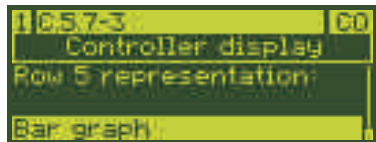
Configure row representation

- 1x Select configuration item 1C.5.7 Row 5 representation.



The currently active setting is displayed: 1C.5.7-1 = Numerical

- 1x Activate configuration item 1C.5.7. The currently active setting is highlighted: Numerical
- 2x Change setting to 1C.5.7-3 (Bar graph).



- 1x Confirm setting.

Return to the operating level

 4x Return to the operating level.



The Output AO1 is displayed in row 5 as a bar graph.

9.3.2 Setting up additional display

If rows 1 to 5 in the display are all assigned and further variables are to be displayed, an additional display can be added. The additional display is activated in the submenu A.2 Operation display. Five additional rows are available. The additional display is set in the submenu C.6 Additional display of the corresponding Controller [1] or [2] (1C.6 or 2C.6).

Note: For control modes with two controllers (M.1-3/-4/-5/-6) either one controller with additional display or both controllers without additional display can be configured. If the additional display of Controller [1], for example, covers the display of Controller [2], the display of Controller [2] can be briefly viewed (approx. 10 s) by pressing one of the cursor keys ,  or the manual/automatic key  in the operating level. It is also possible to display the additional displays of both controllers.

To implement the additional display in the display, it must be activated in the submenu A.2 Operation display.

The following table indicates the settings necessary to set up the additional display (see section 14.2 for details).

	Select variable	Select row representation	Hide row
Row 1	C.6.1-1...41	C.6.2-1...6	C.6.1-0
Row 2	C.6.3-1...41	C.6.4-1...6	C.6.3-0
Row 3	C.6.5-1...41	C.6.6-1...6	C.6.5-0
Row 4	C.6.7-1...41	C.6.8-1...6	C.6.7-0
Row 5	C.6.9-1...41	C.6.10-1...6	C.6.9-0

Example: Based on the example in section 9.3.1, an additional display is to be set up for Controller [1] in the right display section. Its fourth row is to display the output AO2 numerically inverted.

According to the table above, the setting is made in menu 1C Controller [1] in the configuration items 1C.6.7 Row 4 and 1C.6.8 Row 4 representation. To activate the additional display, the configuration item A.2 Operation display must be configured.

The output Y of the controller is to be assigned to the Output AO2 as a source.

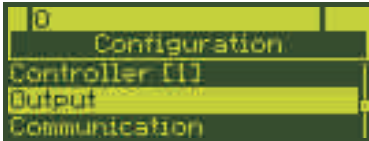
The controller is currently in the operating level.



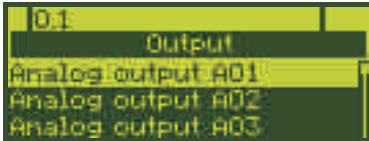
- Enter the configuration level, see section 9.1.

Assign source for Output AO2

- ▼ 3x Select menu O Output.

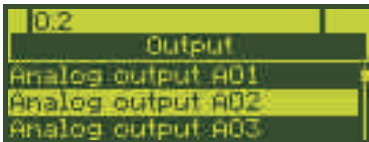


- 1x Enter menu O Output.

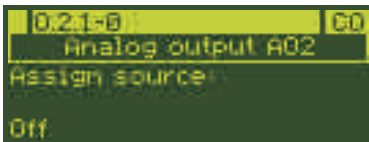


The submenu O.1 Analog output AO1 is highlighted.

- ▼ 1x Select submenu O.2 Analog output AO2.



- 1x Enter submenu O.2 Analog output AO2.



The configuration item O.2.1 Assign source is displayed together with the currently active setting: O.2.1-0 = Off

- 1x Activate configuration item O.2.1. The currently active setting is highlighted: Off

- ▼ 1x Change setting to O.2.1-1 (Controller [1] output Y).

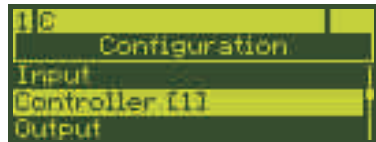


- 1x Confirm setting.

Set up additional display

- ⬅ 2x Exit menu O Output.

- △ 1x Select menu 1C Controller [1].

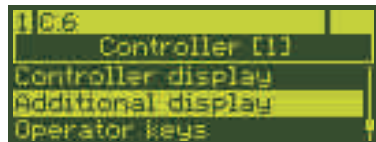


- 1x Enter menu 1C Controller [1].

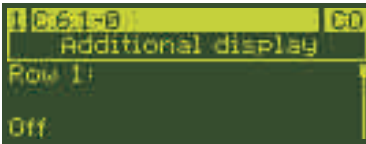


The menu item 1C.1 Input variables is highlighted.

- ▼ 5x Select menu item 1C.6 Additional display.

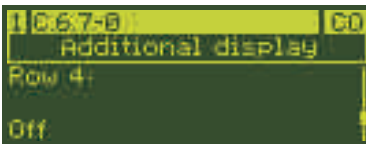


- 1x Activate menu item 1C.6.



The configuration item 1C.6.1 Row 1 is displayed with its currently active setting: 1C.6.1-0 = Off

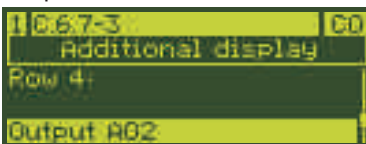
- 3x Select configuration item 1C.6.7 Row 4.



The currently active setting is displayed: 1C.6.7-0 = Off

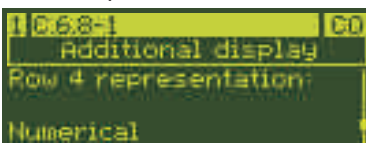
- 1x Activate configuration item 1C.6.7 Row 4.
- The currently active setting is highlighted: Off

- 3x Change setting to C.6.7-3 (Output AO2).



- 1x Confirm setting.

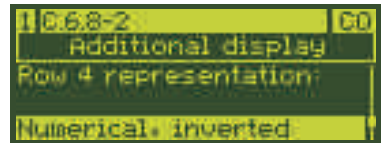
- 1x Select configuration item 1C.6.8 Row 4 representation.



The currently active setting is displayed: 1C.6.8-1 = Numerical

- 1x Activate configuration item 1C.6.8 Row 4 representation.
- The currently active setting is highlighted: Numerical

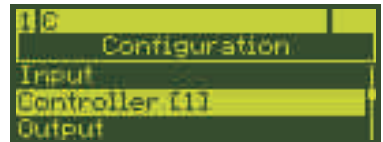
- 1x Change setting to 1C.6.8-2 (Numerical, inverted).



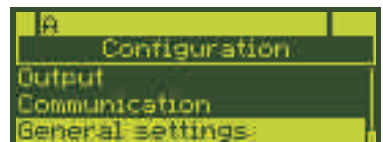
- 1x Confirm setting.

Activate additional display

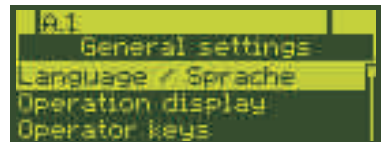
- 2x Return to menu list.



- 3x Select menu item A General settings.

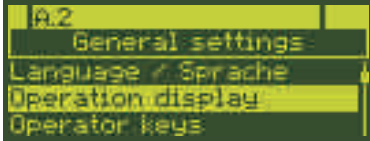


- 1x Enter menu item A General settings.

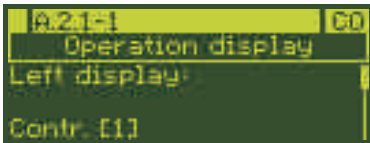


The submenu A.1 Language / Sprache is highlighted.

- ▽ 1x Select submenu A.2 Operation display.

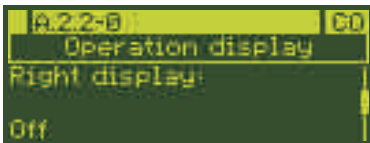


- 1x Enter submenu A.2 Operation display.



The configuration item A.2.1 Left display is displayed together with the currently active setting: A.2.1-1 = Controller [1]

- ▽ 1x Select submenu A.2.2 Right display.



The currently active setting is displayed: Right display = Off

- 1x Enter submenu A.2.2 Right display.
The currently active setting is highlighted: Off

- ▽ 1x Change setting to A.2.2-2 (Controller [1] additional reading).



- 1x Confirm setting.

Return to the operating level

- ⬆ 4x Return to the operating level.



In the additional reading in the display, the Output AO2 is displayed numerically inverted.

9.3.3 Switching Controller [1] and Controller [2] displays

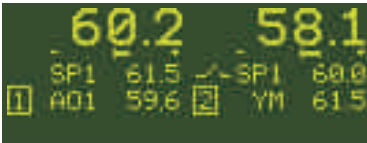
The left display is assigned to Controller [1] and the right display to Controller [2] in the default setting. If required, both controller displays can be switched around so that the left display is for Controller [2] and the right display is for Controller [1].

Example: For cascade control (setting M.1-3) the left display is assigned to the slave controller and the right display is assigned to the master controller. The displays are to be switched so that the master controller (Controller [2]) is shown in the left display and the slave controller (Controller [1]) is shown in the right display. To do this, the submenu settings A.2.1 Left display

and A.2.2 Right display must be changed.

Note: Before Controller [1] can be assigned to the right display, it must first be removed from the left display as one controller cannot be assigned to both displays at the same time.

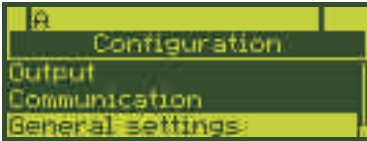
The controller is currently in the operating level.



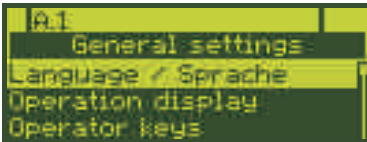
- ▶ Enter the configuration level, see section 9.1.

Deactivate left display

- ▼ 6x Select menu A General settings.

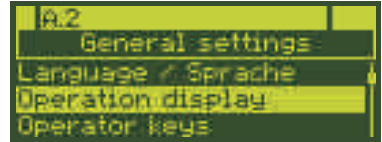


- 1x Enter A General settings.

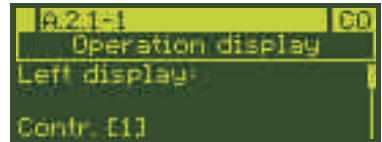


The submenu A.1 Language / Sprache is highlighted.

- ▼ 1x Select submenu A.2 Operation display.



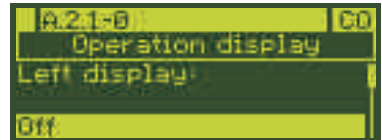
- 1x Enter submenu A.2 Operation display.



The configuration item A.2.1 Left display is displayed together with the currently active setting: A.2.1-1 = Controller [1]

- 1x Activate configuration item A.2.1 Left display.
The currently active setting is highlighted: Controller [1]

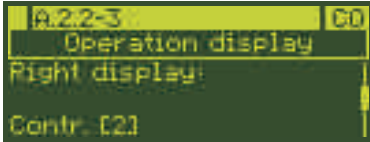
- ▲ 1x Change setting to A.2.1-0 (Off).



- 1x Confirm setting.

Configure right display

- ▽ 1x Select configuration item A.2.2 Right display.



- 1x Activate configuration item A.2.2 Right display. The currently active setting is highlighted: Controller [2]

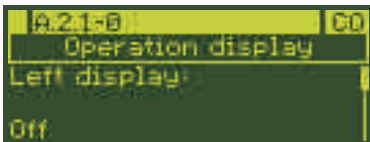
- △ 2x Change setting to A.2.2-1 (Controller [1]).



- 1x Confirm setting.

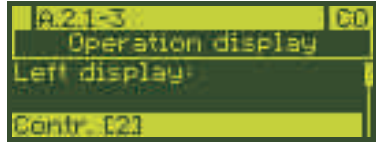
Configure left display

- △ 1x Select configuration item A.2.1 Left display.



- 1x Activate configuration item A.2.1 Left display. The currently active setting is highlighted: Off

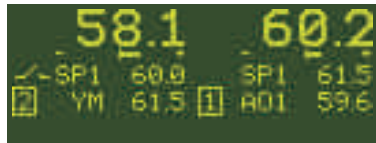
- ▽ 2x Change setting to A.2.1-3 (Controller [2]).



- 1x Confirm setting.

Return to the operating level

- ▲ 4x Return to the operating level.



The left display is now assigned to Controller [2] and Controller [1] is assigned to the right display.

10 Locking the controller

It is possible to prevent unauthorized access to the controller. There are three ways to implement the locking of the controller:

- ▶ Lock the operating level → section 10.1
- ▶ Lock all keys over the digital input → section 10.2
- ▶ Activate key number operation → section 10.3.

10.1 Locking the operating level

Switchover between manual and automatic mode as well as changes to the set point for both Controller [1] and Controller [2] can be locked independently from one another.

Locking is performed in submenu C.7 Operator keys of either Controller [1] or [2] by setting the configuration items C.7.2-1 Lock manual/auto key = On and/or C.7.3-1 Lock set point keys = On.

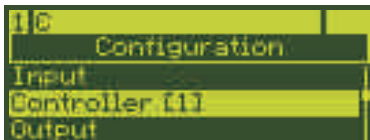
Example: The set point adjustment of Controller [1] is to be locked.

The controller is currently in the operating level.

- ▶ Enter the configuration level, see section 9.1.

Activate locking

- ▼ 2x Select menu 1C Controller [1].



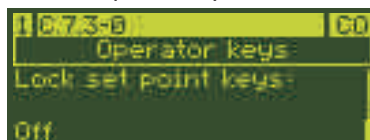
- 1x Enter menu 1C Controller [1]. The submenu 1C.1 Input variables is highlighted.

- ▼ 6x Select submenu 1C.7 Operator keys.



- 1x Enter submenu 1C.7 Operator keys. The configuration item 1C.7.1 Invert manual output value is displayed with its currently active setting.

- ▼ 2x Select configuration item 1C.7.3 Lock set point keys.



- 1x Activate configuration item 1C.7.3 Lock set point keys. The currently active setting is highlighted: Off

- ▼ 1x Change setting to 1C.7.3-1 (On).



- 1x Confirm setting.

- ⬆ 4x Return to the operating level.

Set point adjustment is locked in automatic mode in the operating level.

Note: The operating menu Controller [1] is not affected by the locking function. The set point can still be changed (see section 8.4).

10.2 Locking all keys over a digital input

The operator keys are locked when the selected digital input is active.

The key locking is set in the menu A General settings in configuration item A.3.1.

Example: The operator keys are to be locked by the active digital input DI2.

The controller is currently in the operating level.

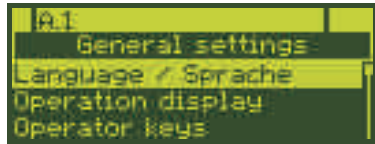
- Enter the configuration level, see section 9.1.

Activate locking

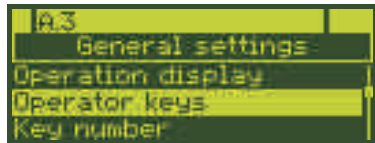
- ▽ 6x Select menu A General settings.



- 1x Activate menu A General settings.



- ▽ 2x Select submenu A.3 Operator keys.



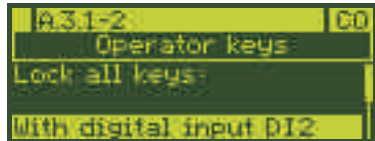
- 1x Enter submenu A.3 Operator keys.



The configuration item A.3.1 Lock all keys is displayed with its currently active setting: Off

- 1x Activate configuration item A.3.1 Lock all keys.
The currently active setting is highlighted: Off

- ▽ 2x Change setting to A.3.1-2 (With digital input DI2).



- 1x Confirm setting.
- ⬆ 4x Return to the operating level.

The operator keys are locked when the digital input DI2 is active. Settings cannot be changed.

10.3 Activating key number operation

When key number operation is activated, control parameter settings in the operating menu as well as settings in the configuration level can only be changed after entering a key number. The activation of the key number operation remains effective until the configuration level is left.

Note: The key number can be entered in the range between 0 and 9999. It is advisable to note down the key number as it is needed to deactivate the key number operation as well.

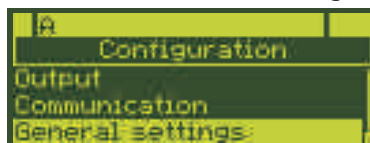
Key number operation is activated in the configuration level in the configuration item A.4.1:

The controller is currently in the operating level.

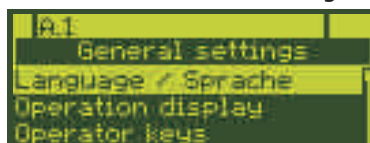
- Enter the configuration level, see section 9.1.

Activate key number operation

- ▼ 5x (control modes with one controller)
 - 6x (control modes with two controllers)
- Select menu A General Settings.

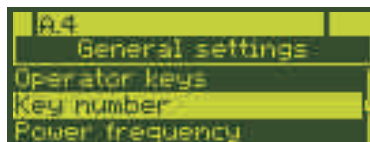


- 1x Enter menu A General Settings.

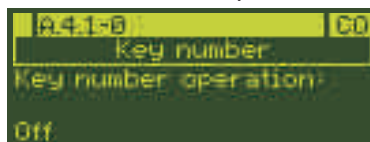


The submenu A.1 Language / Sprache is highlighted.

- ▼ 3x Select submenu A.4 Key number.



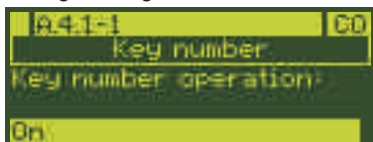
- 1x Enter submenu A.4 Key number.



The configuration item A.4.1 Key number operation is displayed together with the currently active setting: A.4.1-0 = Off

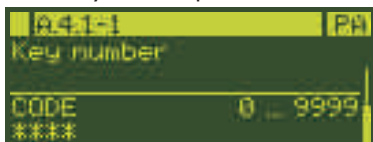
- 1x Activate configuration item A.4.1 Key number operation. The currently active setting is highlighted: Off

- ▽ 1x Change setting to A.4.1-1 (On).

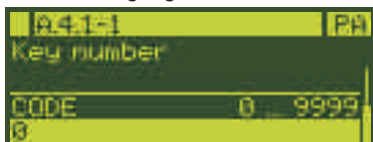


- 1x Confirm setting.

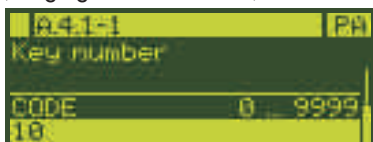
- ▽ 1x Select Key number parameter.



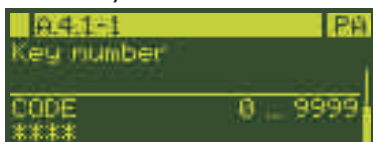
- 1x Activate Key number parameter.
The current user key number (0 = default) is highlighted.



- △ ... Change the key number as required (ranging from 0 to 9999).



- 1x Confirm key number.



- ⬆ 4x Return to the operating level.

From now on, changes to control parameter settings in the operating menu and changes in the configura-

tion level can only be performed after the key number has been entered using the cursor key (△) and confirmed by pressing the enter key (■).

Deactivate key number operation

Key number operation is deactivated by setting A.4.1-0.

Note: An overriding service key number is specified on the last page of the printed instructions which allows configuration settings and parameters to be changed regardless of user key number operation.

To avoid the unauthorized use of the service key number, it should be removed from the printed instructions and kept in a safe place.

11 User calibration

The analog inputs and outputs are factory-calibrated.

A system-related user calibration can compensate for long cables, small wire cross-sections or tolerances of measuring transducers and actuators. The calibration is similar in principle to a scaling. The gradient and zero shift are automatically calculated by the controller.

Note: The function A.21.1-2 allows the controller to be reset to factory-calibration settings.

11.1 Calibrating analog inputs

- ▶ Connect signal source at the input.

Zero

- ▶ Enter menu item Zero depending on the analog input and signal type, e.g. A.20.1.9 for Analog input AI1 and Pt 100 (see section 14.2).
- ▶ Set the signal source to the initial value. If the input value is within the range that can be calibrated, the selection bar is displayed.
- ▶ Press the enter key () to confirm the value. The zero point is calibrated.

End value

- ▶ Enter menu item End depending on the analog input and signal type, e.g. A.20.1.10 for Analog input AI1 and Pt 100 (see section 14.2).
- ▶ Set the signal source to the end value. If the input value is within the range that

can be calibrated, the selection bar is displayed.

- ▶ Press the enter key () to confirm the value. The end value is calibrated.

11.2 Calibrating analog outputs

- ▶ Connect a precision measuring instrument at the output.

Zero

- ▶ Enter menu item Zero depending on the analog output and signal type, e.g. A.20.5.1 for Analog output AO1 and mA signal (see section 14.2).
- ▶ Set the output signal using the cursor keys ( and ) to the initial value. If the output value is within the range that can be calibrated, the selection bar is displayed.
- ▶ Press the enter key () to confirm the value. The zero point is calibrated (display: 0.0 %).

End value

- ▶ Enter menu item End depending on the analog output and signal type, e.g. A.20.5.2 for Analog output AO1 and mA signal (see section 14.2).
- ▶ Set the output signal using the cursor keys ( and ) to the final value. If the output value is within the range that can be calibrated, the selection bar is displayed.
- ▶ Press the enter key () to confirm the value. The end value is calibrated (display: 100.0 %).

12 Fault alarms

The fault alarm icon  is displayed and the digital output DO7 is activated when a fault alarm has been registered.



Possible sources of error are displayed in the info menu on selecting the menu item Error messages. If several errors exist, use the cursor keys (, ) to browse through the errors.

As soon as an error has been corrected, it is removed from the list of errors and is no longer displayed.

Incoming and outgoing error messages are time-stamped and saved in the last events list (info menu).

The following error table contains possible causes and the recommended action.

Note: We recommend for any errors not described in detail to switch off the power supply and to wait approx. five seconds before switching it on again.

The digital outputs DO5 and DO6 can be configured so that they are activated when a sensor/signal error or communication failure occurs. See configuration item O.10.1 and O.11.1 in section 14.2.

Error message	Possible cause	Recommended action
AI1(2, 3, 4) Wrong switch position	The position of the two DIP switches for the analog input configuration is not identical.	Re-position DIP switches (see section 5.2).
AI1(2, 3, 4) below range	The input signal is 5 % below the lower value of the rated signal range.	• Check input signal setting. • Check the sensor lead for sensor/wire breakage or for a short circuit. • Check electrical connection to terminal strip 1 (analog inputs). See section 4.
AI1(2, 3, 4) above range	The input signal is 5 % above the upper value of the rated signal range.	
C1(2)–SPC below range	The given set point is lower than the lower measuring range value AI1(2, 3, 4).MIN of the analog input assigned to the controlled variable PV.	Check value

Error message	Possible cause	Recommended action
C1(2)–SPC above range	The given set point is higher than the upper measuring range value AI1(2, 3, 4).MAX of the analog input assigned to the controlled variable PV.	Check value
Internal temperature sensor defective	The sensor for monitoring the temperature inside the controller is defective.	Send controller back to SAMSON AG for repair.
Internal temperature Temperature too low (–5 °C)	The permissible ambient temperature between 0 and 50 °C has not been kept.	• Check the ambient temperature. • Check location of installation.
Internal temperature Temperature too high (65 °C)		
Communication failure AI1(2, 3, 4) Timeout	No write access given within the timeout for the signal monitoring of the interface assigned to an analog input.	• Check timeout setting (AI1(2, 3, 4).TOUT parameter in configuration item I.1(2, 3, 4).1). • Check interface (see section 13).
Communication failure C1(2)– SPC Timeout	No write access given within the timeout for the signal monitoring of the interface assigned to Controller [1] or [2].	• Check timeout setting (SPC.TOUT parameter in configuration item C.2.1.6). • Check interface (see section 13).

13 Interfaces

The TROVIS 6495-2 Controller is equipped with an infrared interface. In addition, it can be fitted with one of two optional interface boards. Data can be transferred between TROVIS-VIEW and the Controller over the interfaces. Refer to section 14.5.

- ▶ Infrared interface: Infrared adapter (RS-232)
- ▶ RS-232/USB interface board : Connecting cable RJ12/D-sub 9-pin (RS-232)
or
USB cable (5-pin mini-B – USB type A)
- ▶ RS-485/USB interface board: USB cable (5-pin mini-B – USB type A)

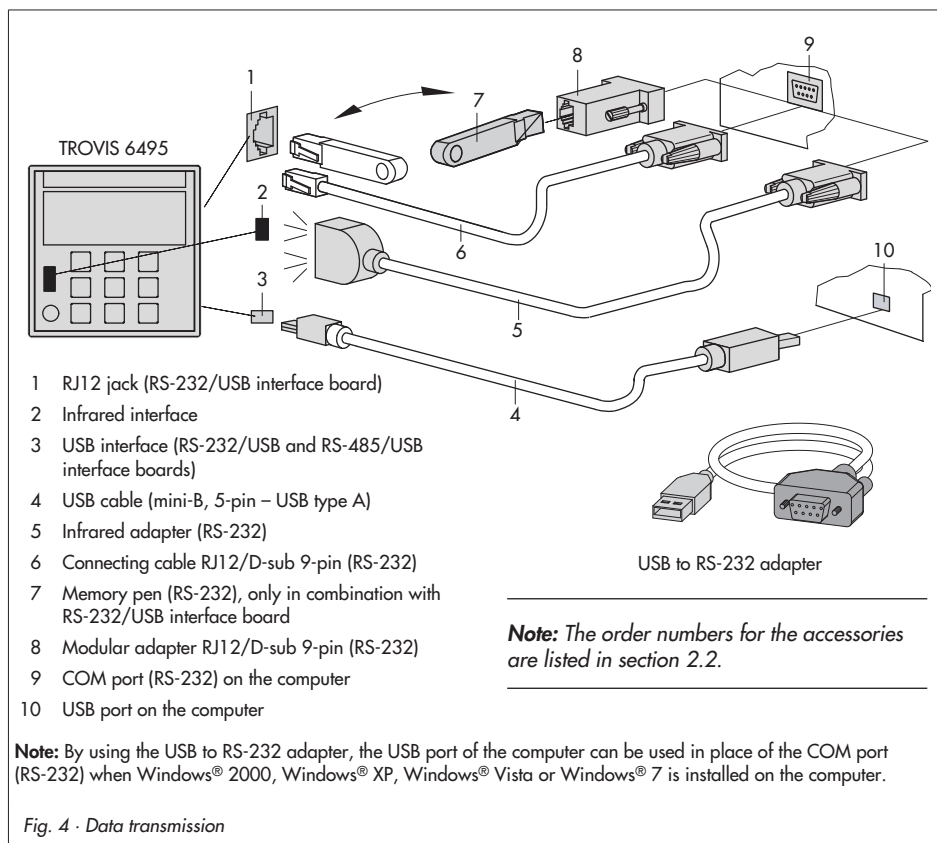
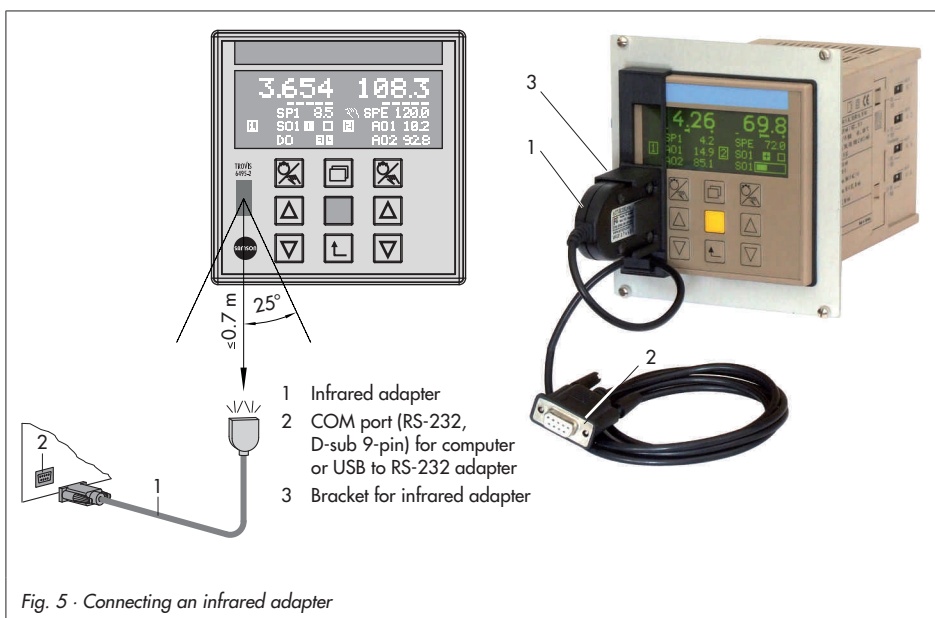


Fig. 4 · Data transmission

13.1 Infrared interface

The infrared interface can be accessed from the front of the controller. It is located above the SAMSON logo (Fig. 5).

An infrared adapter (order no. 8864-0900) is required for data transmission between the serial RS-232 port of the computer and the infrared interface integrated in the controller. A bracket (order no. 1400-9769) ensures that the adapter is properly aligned in front of the controller. The infrared adapter can be connected to the USB port of the computer using the USB to RS-232 adapter (order no. 8812-2001). For this purpose, a driver must be installed on the computer. This driver can be downloaded from the Internet at www.samson.de in Services > Software > TROVIS-VIEW > Downloads for USB drivers > USB-RS232 adapter (8812-2001).



Note: To ensure data transmission functions properly, place the infrared adapter so that the distance to the infrared interface does not exceed 0.7 m and that the max. angle 25° is kept.

13.2 Optional interface boards

The controller can optionally be fitted with either a RS-232/USB interface board or a RS-485/USB interface board. These boards can be retrofitted.

Installing the interface board

The optional interface board is fitted at the back of the controller.

1. Press the two catches on the blank cover inwards at the same time. Pull out the blank cover.
2. Push the interface board with cover into the opening, making sure that the interface board rests on the guide intended for it and that the cover locks in place.

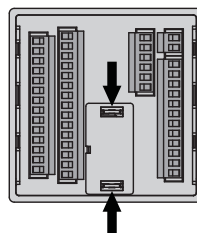


Fig. 6 · Blank cover at the back of the controller

13.2.1 RS-232/USB interface board

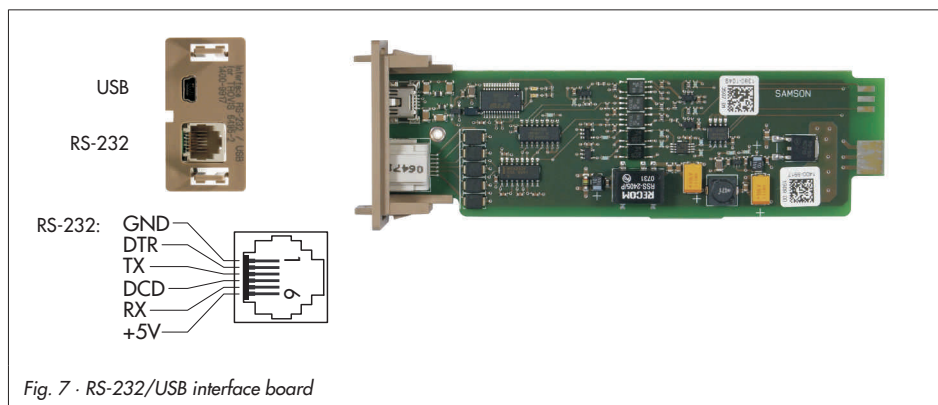


Fig. 7 · RS-232/USB interface board

Upgrading the controller with the optional RS-232/USB interface board (slave) (order no. 1400-9917) allows data transmission over the RJ12 jack or over the USB port. In addition, a memory pen (see section 14.7) can be plugged into the RJ12 jack.

The RS-232/USB interface board (slave) includes:

- ▶ RS-232 interface (RJ12 jack)
- ▶ USB interface (5-pin mini-B port) (slave)

RS-232 data transmission is implemented using SSP or Modbus RTU protocol.

The protocol of the RS-232 interface is set at the controller in the configuration item D.2.1.

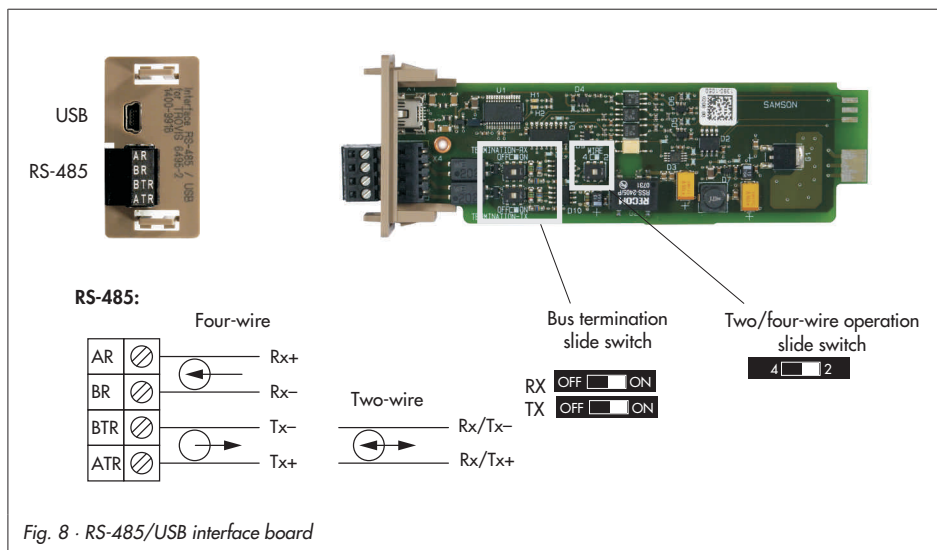
The first time the USB interface is used to connect the controller to the computer, the device driver is demanded. The driver is included on the TROVIS-VIEW CD-ROM (USB Driver > USB-RS232 Adapter 8812-2001) or can be downloaded from the Internet at www.samson.de in Services > Software > TROVIS-VIEW > Downloads for USB drivers > USB-RS232 adapter (8812-2001).

13.2.2 RS-485/USB interface board

To integrate the controller into a communications network, the controller can be fitted with an optional interface board RS-485 Modbus RTU (order no. 1400-9918). The USB connection can be used to transfer data using TROVIS-VIEW.

The RS-485/USB interface board includes:

- ▶ RS-485 interface (4 terminals)
- ▶ USB interface (5-pin mini-B port) (slave)



RS-485 data transmission is implemented using SSP or Modbus RTU protocol. Slide switches are used to set the 2-/4-wire operation and to activate bus termination.

The protocol of the RS-485 interface is set at the controller in the configuration item D.3.1.

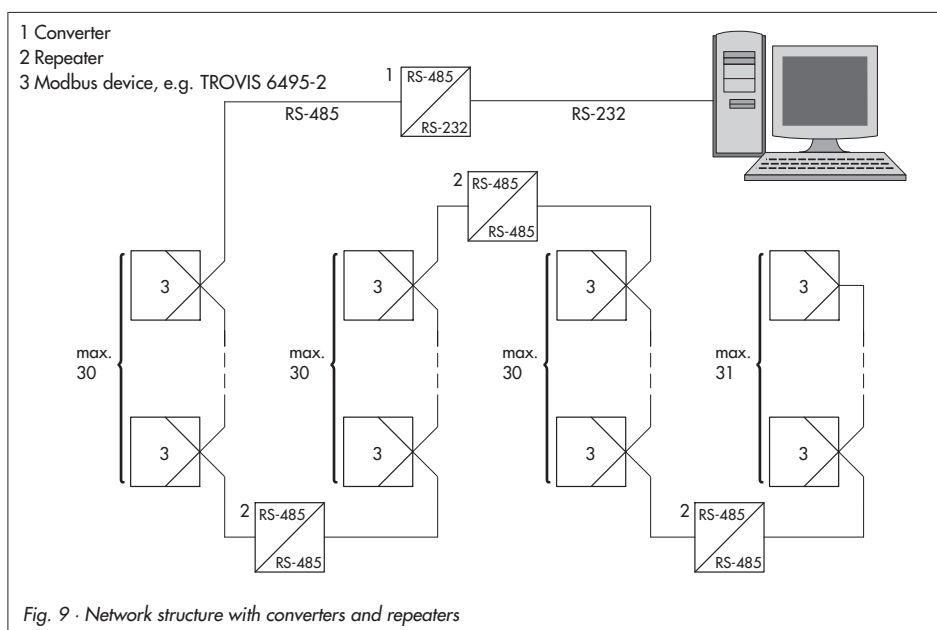
The first time the USB interface is used to connect the controller to the computer, the device driver is demanded. The driver is included on the TROVIS-VIEW CD-ROM (USB Driver > USB-RS232 Adapter 8812-2001) or can be downloaded from the Internet at www.samson.de in Services > Software > TROVIS-VIEW > Downloads for USB drivers > USB-RS232 adapter (8812-2001).

Note: The A/B naming of the RS-485 connectors corresponds to the naming used by various RS-485 chip manufacturers. Although this naming is in widespread use, it is in conflict with the naming used in the interface standard EIA-485, which specifies A as the inverting pin and B as the non-inverting pin.

<u>TROVIS 6495-2</u>	<u>EIA-485 standard</u>	<u>Signal</u>
AR	RB	Rx+
BR	RA	Rx-
BTR	TA	Tx-
ATR	TB	Tx+

Network structure

Fig. 9 shows an example for the setup of an automation system with data exchange using Modbus protocol. A maximum of 246 devices can be addressed. First of all, a converter must be connected to the computer to convert the RS-232 signal issued by the computer into a RS-485 signal. A repeater must be used if the line exceeds a length of 1200 m or if more than 32 participants are connected to the bus. No more than three repeaters should be connected in series. As a result, lines of 4800 m can be achieved. Ten of these lines can be connected in parallel on extending the network. Bus terminators must be fitted at the beginning and end of every section, e.g. between the converter and repeater.



13.3 SAMSON memory pen

Note: The memory pen can only be used when the controller is fitted with a RS-232/USB interface board.

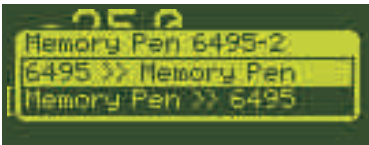
The SAMSON memory pen serves as a data carrier and is able to load and store data in its non-volatile memory.

The memory pen can be loaded with data configured in TROVIS-VIEW and the settings transferred to one or several controllers of the same type and version. In the same way, the memory pen can be used to upload data from the controller allowing you to simply copy the configuration data from one controller to another controller of the same type and version.

Data transmission between TROVIS-VIEW and memory pen

1. Plug memory pen into the RJ12 jack at the RS-232/USB board of the controller.

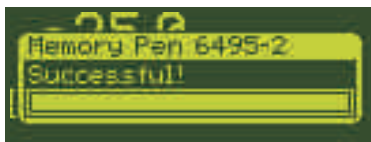
The following appears on the display when the controller recognizes the memory pen:



In the top row of the display, the device type whose data is contained on the memory pen is indicated. You can select whether the data from the controller are to be uploaded onto the memory pen or whether the data from the memory pen are to be downloaded to the controller. If the memory pen contains, for example, data from another device type, the option to download from the pen does not appear. If the memory pen is write-protected, the option to upload data does not appear.

2. Select option (☐, ☐):
 6495 >> Memory pen: Data are uploaded from the controller to the memory pen.
 Memory pen >> 6495: Data are downloaded from the memory pen to the controller.
3. Confirm setting (☐).
 Data transmission starts.

The following display appears when data transmission is completed:



The memory pen can be removed.

14 Appendix

14.1 Technical data

Inputs		
4 analog inputs		mA, V, Pt 100, Pt 1000, input 2 also for potentiometer
Current or voltage inputs	Version	Differential input
	Nominal signal range	0 to 20 mA, 4 to 20 mA, 0 to 10 V, 2 to 10 V
	Resolution	< 0.007 %, based on nominal signal range
	Permissible signal range	–1 to 22 mA or –0.5 to 11 V
	Input resistance	50 Ω for current input · 10 k Ω for voltage input
	Static destruction limit	± 50 mA for current input · ± 30 V for voltage input
Resistance thermometer	For sensor	Pt 100, Pt 1000, according to DIN EN 60751
	Nominal signal range	–50 to 300 °C (–58 to 572 °F)
	Connection	Three-wire circuit (resistance per lead < 15 Ω), two-wire circuit
	Resolution	< 0.02 K (< 0.006 % based on nominal signal range)
Potentiometer	Nominal values	100, 200, 500, 1000 Ω
	Connection	Three-wire circuit, resistance per lead < 15 Ω
	Resolution	< 0.006 %
General specifications	Measuring error of inputs for zero, span, linearity	< ± 0.2 % of nominal signal range
	Ambient temperature influence	< ± 0.1 %/10 K for zero and span, based on 20 °C
	Input filter	Selectable
	Function generation	Selectable using 7 points
	Signal increase/drop	Selectable
	User calibration	Selectable
	Transmitter fault alarm	Selectable, input signal < –5 % or > 105 %
	Transmitter supply	Supply output at terminals 89 and 90 21 V DC, max. 90 mA, resistant to short-circuiting

4 digital inputs		
	Control	Floating switching contact or external switching voltage 24 V DC, 3 mA sets of two digital inputs are galvanically connected on one side Signal state 'OFF' at 0 to 10 V, Signal state 'ON' at 17 to 31 V, signal inversion can be configured
Outputs		
3 analog outputs		
	Nominal signal range	0 to 20 mA, 4 to 20 mA, 0 to 10 V, 2 to 10 V
	Max. permissible signal range	0 (2.4) to 22 mA or 0 (1.2) to 11 V
	Load	< 750 Ω for current; > 3 k Ω for voltage
	Error of outputs	< $\pm 0.2\%$ of the nominal signal range for zero, span, linearity
	Ambient temperature influence	< $\pm 0.1\%/10\text{ K}$ for zero and span, based on 20 °C
	Resolution	< 0.03 %, based on nominal signal range
	Static destruction limit	$\pm 30\text{ V}$
7 digital outputs		
Relay outputs	4 relays with floating NO contact, can be inverted	
	Permissible contact load	264 V AC, 1 A AC, $\cos \phi = 1$ or 250 V DC, 0.1 A DC
	Spark suppression	Parallel connection C = 2.2 nF and varistor 300 V AC, in parallel to each relay contact
Transistor outputs	3 electrically isolated transistor outputs	
	External supply	3 to 42 V DC, max. 30 mA
Interfaces		
Infrared interface	Transmission protocol	SAMSON-specific protocol (SSP)
	Data that can be transmitted	Controller settings, process variables, operating status
	Transmission rate	9600 bit/s
	Angle of deflection	50°
	Distance IR adapter – controller	$\leq 70\text{ cm}$

RS-232/USB (accessories)	RS-232 with electrical isolation, USB (slave)	
	Connection	USB: 5-pin mini-B RS-232: RJ 12
	Transmission protocol	USB: SAMSON-specific protocol (SSP) RS-232: SSP and Modbus RTU
	Data that can be transmitted	Controller settings, process variables, operating status, fault alarms
RS-485/USB (accessories)	RS-485 with electrical isolation, USB (slave)	
	Connection	USB: 5-pin mini-B RS-485: 4-pin screw terminals
	Transmission protocol	USB: SAMSON-specific protocol (SSP) RS-485: SSP and Modbus RTU
	Data that can be transmitted	Controller settings, process variables, operating status, fault alarms
	Transmission rate/format	SSP: 9600 bit/s, 8 bit, no parity bit, 1 start bit Modbus: 300 to 115200 bit/s, 8 bit, parity bit adjustable, 1 (2) stop bits
	Type of transmission	RS-485: Asynchronous, half duplex, 4-wire or 2-wire
	Number of connected devices	RS-485: 32 (can be extended when a repeater is used)
	Number of addressable stations	246 (with Modbus)
	Line length	RS-485: < 1200 m, max. 4800 m with repeater
	RS-485 bus termination	Active, selectable
	Transmission medium	RS-485: 2 or 4 cores (twisted-pair cabling, stranded in pairs, with static shield)
General specifications		
Power supply		85 to 264 V AC, 47 to 63 Hz or 24 V AC/DC (20 to 30 V), 47 to 63 Hz
Power consumption	85 to 264 V AC	max. 19 VA, external fuse > 630 mA (slow)
	20 to 30 V AC/DC	max. 15 VA, external fuse > 1.25 A (slow)
Temperature		Ambient: 0 to 50 °C · Storage: – 20 to 70 °C
Degree of protection		IP 65 (front), IP 30 (housing), IP 00 (terminals) according to EN 60529

Device safety	According to EN 61010-1: Class of protection II Overvoltage category II Degree of contamination 2
Electromagnetic compatibility	Requirements according to EN 61000-6-2, EN 61000-6-3 and EN 61326-1
Environmental effects on storage, transportation and operation	Sinusoidal vibrations acc. to IEC 60068-2-6: 2 to 9 Hz; amplitude 3.5 mm 9 to 200 Hz; acceleration 10 m/s ² 200 to 500 Hz; acceleration 15 m/s ² Random vibrations acc. to IEC 60068-2-64: 1.0 m ² /s ³ ; 10 to 200 Hz 0.3 m ² /s ³ ; 200 to 2000 Hz Shocks acc. to IEC 60068-2-27: Acceleration 100 m/s ² , duration 11 ms
Relative humidity	Max. 95 %, non-condensing
Electrical connection	Plug-on screw terminals 1.5 mm ² (0.5 to 1.5 mm ² wire cross-section)
Display	Dot matrix display with 132 x 49 pixels
Display range	–999 to 9999; start value, end value and decimal separator can be selected
Scanning time	100 ms
Configuration	Functions saved in read-only memory, configuration saved in non-volatile memory
Control modes	One or two fixed set point/follow-up control One ratio control One cascade control One ratio and fixed set point/follow-up control One override control
Weight	0.5 kg
Conformity	

14.2 Configuration list

Note: Some functions and parameters can only be selected after certain initial settings have been made beforehand. The initial setting required is specified in angle brackets in the following list. A comma represents "and" and a slash represents "or" in the following list.

Example <M.1-5/-6, I.3.5≠0>: Either the configuration M.1-5 and I.3.5≠0 or the configuration M.1-6 and I.3.5≠0 must initially be set.

M Control mode

NOTICE			Default setting	Setting
Changing the control mode causes the controller to be reset to its default settings.				
	M.1	Control mode	M.1.1-1	
	-1	1x fixed set point/follow-up control		
	-2	Ratio control		
	-3	Cascade control		
	-4	Override control		
	-5	2x fixed set point/follow-up control		
	-6	Ratio control + Controller		

I Input

			Default setting	Setting
	I.1	Analog input AI1		
Analog input AI1	I.1.1	Input signal	I.1.1-6	
	-1	4–20 mA <both DIP switches on right: mA/V>		
	-2	0–20 mA <both DIP switches on right: mA/V>		
	-3	0–10 V <both DIP switches on right: mA/V>		
	-4	2–10 V <both DIP switches on right: mA/V>		
	-5	Via interface		
	-6	Pt 100 <both DIP switches on left: Pt 100/Pt 1000>		
	-7	Pt 1000 <both DIP switches on left: Pt 100/Pt 1000>		
	AI1.MIN	Lower range value [–999.0 ... 9999.0]	0.0	
	AI1.MAX	Upper range value [–999.0 ... 9999.0]	100.0	

			Default setting	Setting
Analog input AI1	AI1.K1	Initial value <I.1.1-5> · Default value <I.1.5-2> [-999.0 ... 9999.0]	0.0	
	I.1.2	Decimal point	I.1.2-1	
	-0	XXXX No decimal place		
	-1	XXX.X 1 decimal place		
	-2	XX.XX 2 decimal places		
	-3	X.XXX 3 decimal places		
	I.1.3	Physical unit	I.1.3-1	
	-0	Off <not with I.1.1-6/-7>		
	-1	°C Temperature		
	-2	°F Temperature		
	-3	K Temperature <not with I.1.1-6/-7>		
	-4	bar Pressure <not with I.1.1-6/-7>		
	-5	mbar Pressure <not with I.1.1-6/-7>		
	-6	psi Pressure <not with I.1.1-6/-7>		
	-7	kPa Pressure <not with I.1.1-6/-7>		
	-8	m³/h Flow rate <not with I.1.1-6/-7>		
	-9	l/h Flow rate <not with I.1.1-6/-7>		
	-10	ft³/h Flow rate <not with I.1.1-6/-7>		
	-11	kg/h Mass flow <not with I.1.1-6/-7>		
	-12	t/h Mass flow <not with I.1.1-6/-7>		
	-13	lb/h Mass flow <not with I.1.1-6/-7>		
	-14	% <not with I.1.1-6/-7>		
	-15	mFS Filling level <not with I.1.1-6/-7>		
	-16	mmFS Filling level <not with I.1.1-6/-7>		
	-17	inH₂O Filling level (inch water column) <not with I.1.1-6/-7>		
	-18	%rF Relative humidity <not with I.1.1-6/-7>		
	-19	kg/m³ Density <not with I.1.1-6/-7>		
	-20	pH pH value <not with I.1.1-6/-7>		
	I.1.4	Input signal increase/decrease	I.1.4-0	
	-0	Off		
	-1	On		
	AI1.COR	Correction value <I.1.4-1> [-999.0 ... 9999.0]	0.0	
	I.1.5	Signal monitoring	I.1.5-0	
	-0	Off		
	-1	On		
	-2	On (with default value)		
	AI1.K1	Default value <I.1.5-2> · Initial value <I.1.1-5> [-999.0 ... 9999.0]	0.0	
	AI1.TOUT	Timeout interface <I.1.1-5, I.1.5≠0> [1 ... 99999 s]	60 s	

			Default setting	Setting
Analog input AI1	I.1.6	Manual mode Controller [1] at signal error <I.1.5≠0>	I.1.6-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-1>		
	-2	Constant output value at AO2 <O.2.1-1>		
	-3	Constant output value at AO3 <O.3.1-1>		
	-4	Constant output value at SO1 <O.4.1-1>		
	-5	Constant output value at SO2 <O.5.1-1>		
	-6	With last output value <O.1.1-1/O.2.1-1/O.3.1-1/O.4.1-1/O.5.1-1>		
	AO1.K1	Constant output value at AO1 <I.1.6-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.1.6-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.1.6-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.1.6-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.1.6-5> [-10.0 ... 110.0 %]	0.0 %	
	I.1.7	Manual mode Controller [2] at signal error <M.1-5/-6, I.1.5≠0>	I.1.7-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-2>		
	-2	Constant output value at AO2 <O.2.1-2>		
	-3	Constant output value at AO3 <O.3.1-2>		
	-4	Constant output value at SO1 <O.4.1-2>		
	-5	Constant output value at SO2 <O.5.1-2>		
	-6	With last output value <O.1.1-2/O.2.1-2/O.3.1-2/O.4.1-2/O.5.1-2>		
	AO1.K1	Constant output value at AO1 <I.1.7-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.1.7-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.1.7-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.1.7-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.1.7-5> [-10.0 ... 110.0 %]	0.0 %	
I.2	Analog input AI2			
I.2.1	Input signal		I.2.1-6	
-1	4–20 mA <both DIP switches on right: mA/V>			
-2	0–20 mA <both DIP switches on right: mA/V>			
-3	0–10 V <both DIP switches on right: mA/V>			
-4	2–10 V <both DIP switches on right: mA/V>			
-5	Via interface			
-6	Pt 100 <both DIP switches on left: Pt 100/Pt 1000/potentiometer>			
-7	Pt 1000 <both DIP switches on left: Pt 100/Pt 1000/potentiometer>			

			Default setting	Setting
Analog input AI2	I.2.1	Input signal		
	-8	Potentiometer 100 Ohm <both DIP switches on left: Pt 100/Pt 1000/potentiometer>		
	-9	Potentiometer 200 Ohm <both DIP switches on left: Pt 100/Pt 1000/potentiometer>		
	-10	Potentiometer 500 Ohm <both DIP switches on left: Pt 100/Pt 1000/potentiometer>		
	-11	Potentiometer 1000 Ohm <both DIP switches on left: Pt 100/Pt 1000/potentiometer>		
	AI2.MIN	Lower range value [-999.0 ... 9999.0]	0.0	
	AI2.MAX	Upper range value [-999.0 ... 9999.0]	100.0	
	AI2.K1	Initial value <I.2.1-5> · Default value <I.2.5-2> [-999.0 ... 9999.0]	0.0	
	I.2.2	Decimal point	I.2.2-1	
	-0	XXXX No decimal place		
	-1	XXX.X 1 decimal place		
	-2	XX.XX 2 decimal places		
	-3	X.XXX 3 decimal place		
	I.2.3	Physical unit	I.2.3-1	
	-0	Off <not with I.2.1-6/-7>		
	-1	°C Temperature		
	-2	°F Temperature		
	-3	K Temperature <not with I.2.1-6/-7>		
	-4	bar Pressure <not with I.2.1-6/-7>		
	-5	mbar Pressure <not with I.2.1-6/-7>		
	-6	psi Pressure <not with I.2.1-6/-7>		
	-7	kPa Pressure <not with I.2.1-6/-7>		
	-8	m ³ /h Flow rate <not with I.2.1-6/-7>		
	-9	l/h Flow rate <not with I.2.1-6/-7>		
	-10	ft ³ /h Flow rate <not with I.2.1-6/-7>		
	-11	kg/h Mass flow <not with I.2.1-6/-7>		
	-12	t/h Mass flow <not with I.2.1-6/-7>		
	-13	lb/h Mass flow <not with I.2.1-6/-7>		
	-14	% <not with I.2.1-6/-7>		
	-15	mFS Filling level <not with I.2.1-6/-7>		
	-16	mmFS Filling level <not with I.2.1-6/-7>		
	-17	inH ₂ O Filling level (inch water column) <not with I.2.1-6/-7>		
	-18	%rF Relative humidity <not with I.2.1-6/-7>		
	-19	kg/m ³ Density <not with I.2.1-6/-7>		
	-20	pH pH value <not with I.2.1-6/-7>		

			Default setting	Setting
Analog input AI2	I.2.4	Input signal increase/decrease	I.2.4-0	
	-0	Off		
	-1	On		
	AI2.COR	Correction value <I.2.4-1> [-999.0 ... 9999.0]	0.0	
	I.2.5	Signal monitoring	I.2.5-0	
	-0	Off		
	-1	On		
	-2	On (with default value)		
	AI2.K1	Default value <I.2.5-2> · Initial value <I.2.1-5> [-999.0 ... 9999.0]	0.0	
	AI2.TOUT	Timeout interface <I.2.1-5, I.2.5≠0> [1 ... 99999 s]	60 s	
	I.2.6	Manual mode Controller [1] at signal error <I.2.5≠0>	I.2.6-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-1>		
	-2	Constant output value at AO2 <O.2.1-1>		
	-3	Constant output value at AO3 <O.3.1-1>		
	-4	Constant output value at SO1 <O.4.1-1>		
	-5	Constant output value at SO2 <O.5.1-1>		
	-6	With last output value <O.1.1-1/O.2.1-1/O.3.1-1/O.4.1-1/O.5.1-1>		
	AO1.K1	Constant output value at AO1 <I.2.6-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.2.6-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.2.6-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.2.6-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.2.6-5> [-10.0 ... 110.0 %]	0.0 %	
	I.2.7	Manual mode Controller [2] at signal error <M.1-5/-6, I.2.5≠0>	I.2.7-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-2>		
	-2	Constant output value at AO2 <O.2.1-2>		
	-3	Constant output value at AO3 <O.3.1-2>		
	-4	Constant output value at SO1 <O.4.1-2>		
	-5	Constant output value at SO2 <O.5.1-2>		
	-6	With last output value <O.1.1-2/O.2.1-2/O.3.1-2/O.4.1-2/O.5.1-2>		
	AO1.K1	Constant output value at AO1 <I.2.7-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.2.7-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.2.7-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.2.7-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.2.7-5> [-10.0 ... 110.0 %]	0.0 %	

			Default setting	Setting
Analog input AI3	I.3	Analog input AI3		
	I.3.1	Input signal	I.3.1-1	
	-1	4–20 mA <both DIP switches on right: mA/V>		
	-2	0–20 mA <both DIP switches on right: mA/V>		
	-3	0–10 V <both DIP switches on right: mA/V>		
	-4	2–10 V <both DIP switches on right: mA/V>		
	-5	Via interface		
	-6	Pt 100 <both DIP switches on left: Pt 100/Pt 1000>		
	-7	Pt 1000 <both DIP switches on left: Pt 100/Pt 1000>		
	AI3.MIN	Lower range value [-999.0 ... 9999.0]	0.0	
	AI3.MAX	Upper range value [-999.0 ... 9999.0]	100.0	
	AI3.K1	Initial value <I.3.1-5> · Default value <I.3.5-2> [-999.0 ... 9999.0]	0.0	
	I.3.2	Decimal point	I.3.2-1	
	-0	XXXX No decimal place		
	-1	XXX.X 1 decimal place		
	-2	XX.XX 2 decimal places		
	-3	X.XXX 3 decimal places		
	I.3.3	Physical unit	I.3.3-0	
	-0	Off <not with I.3.1-6/-7>		
	-1	°C Temperature		
	-2	°F Temperature		
	-3	K Temperature <not with I.3.1-6/-7>		
	-4	bar Pressure <not with I.3.1-6/-7>		
	-5	mbar Pressure <not with I.3.1-6/-7>		
	-6	psi Pressure <not with I.3.1-6/-7>		
	-7	kPa Pressure <not with I.3.1-6/-7>		
	-8	m ³ /h Flow rate <not with I.3.1-6/-7>		
	-9	l/h Flow rate <not with I.3.1-6/-7>		
	-10	ft ³ /h Flow rate <not with I.3.1-6/-7>		
	-11	kg/h Mass flow <not with I.3.1-6/-7>		
	-12	t/h Mass flow <not with I.3.1-6/-7>		
	-13	lb/h Mass flow <not with I.3.1-6/-7>		
	-14	% <not with I.3.1-6/-7>		
	-15	mFS Filling level <not with I.3.1-6/-7>		
	-16	mmFS Filling level <not with I.3.1-6/-7>		
	-17	inH ₂ O Filling level (inch water column) <not with I.3.1-6/-7>		

			Default setting	Setting
Analog input AI3	I.3.3	Physical unit		
	-18	%rF Relative humidity <not with I.3.1-6/-7>		
	-19	kg/m ³ Density <not with I.3.1-6/-7>		
	-20	pH pH value <not with I.3.1-6/-7>		
	I.3.4	Input signal increase/decrease	I.3.4-0	
	-0	Off		
	-1	On		
	AI3.COR	Correction value <I.3.4-1> [-999.0 ... 9999.0]	0.0	
	I.3.5	Signal monitoring	I.3.5-0	
	-0	Off		
	-1	On		
	-2	On (with default value)		
	AI3.K1	Default value <I.3.5-2> · Initial value <I.3.1-5> [-999.0 ... 9999.0]	0.0	
	AI3.TOUT	Timeout interface <I.3.1-5, I.3.5≠0> [1 ... 99999 s]	60 s	
	I.3.6	Manual mode Controller [1] at signal error <I.3.5≠0>	I.3.6-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-1>		
	-2	Constant output value at AO2 <O.2.1-1>		
	-3	Constant output value at AO3 <O.3.1-1>		
	-4	Constant output value at SO1 <O.4.1-1>		
	-5	Constant output value at SO2 <O.5.1-1>		
	-6	With last output value <O.1.1-1/O.2.1-1/O.3.1-1/O.4.1-1/O.5.1-1>		
	AO1.K1	Constant output value at AO1 <I.3.6-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.3.6-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.3.6-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.3.6-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.3.6-5> [-10.0 ... 110.0 %]	0.0 %	
	I.3.7	Manual mode Controller [2] at signal error <M.1-5/-6, I.3.5≠0>	I.3.7-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-2>		
	-2	Constant output value at AO2 <O.2.1-2>		
	-3	Constant output value at AO3 <O.3.1-2>		
	-4	Constant output value at SO1 <O.4.1-2>		
	-5	Constant output value at SO2 <O.5.1-2>		
	-6	With last output value <O.1.1-2/O.2.1-2/O.3.1-2/O.4.1-2/O.5.1-2>		

			Default setting	Setting
	AO1.K1	Constant output value at AO1 <I.3.7-1>	[-10.0 ... 110.0 %]	0.0 %
	AO2.K1	Constant output value at AO2 <I.3.7-2>	[-10.0 ... 110.0 %]	0.0 %
	AO3.K1	Constant output value at AO3 <I.3.7-3>	[-10.0 ... 110.0 %]	0.0 %
	SO1.K1	Constant output value at SO1 <I.3.7-4>	[-10.0 ... 110.0 %]	0.0 %
	SO2.K1	Constant output value at SO2 <I.3.7-5>	[-10.0 ... 110.0 %]	0.0 %

	I.4	Analog input AI4		
Analog input AI4	I.4.1	Input signal	I.4.1-1	
	-1	4–20 mA <both DIP switches on right: mA/V>		
	-2	0–20 mA <both DIP switches on right: mA/V>		
	-3	0–10 V <both DIP switches on right: mA/V>		
	-4	2–10 V <both DIP switches on right: mA/V>		
	-5	Via interface		
	-6	Pt 100 <both DIP switches on left: Pt 100/Pt 1000>		
	-7	Pt 1000 <both DIP switches on left: Pt 100/Pt 1000>		
	AI4.MIN	Lower measuring range	[-999.0 ... 9999.0]	0.0
	AI4.MAX	Upper measuring range	[-999.0 ... 9999.0]	100.0
	AI4.K1	Initial value <I.4.1-5> · Default value <I.4.5-2>	[-999.0 ... 9999.0]	0.0
	I.4.2	Decimal point	I.4.2-1	
	-0	XXXX No decimal place		
	-1	XXX.X 1 decimal place		
	-2	XX.XX 2 decimal places		
	-3	X.XXX 3 decimal places		
	I.4.3	Physical unit	I.4.3-0	
	-0	Off <not with I.4.1-6/-7>		
	-1	°C Temperature		
	-2	°F Temperature		
	-3	K Temperature <not with I.4.1-6/-7>		
	-4	bar Pressure <not with I.4.1-6/-7>		
	-5	mbar Pressure <not with I.4.1-6/-7>		
	-6	psi Pressure <not with I.4.1-6/-7>		
	-7	kPa Pressure <not with I.4.1-6/-7>		
	-8	m³/h Flow rate <not with I.4.1-6/-7>		
	-9	l/h Flow rate <not with I.4.1-6/-7>		
	-10	ft³/h Flow rate <not with I.4.1-6/-7>		

			Default setting	Setting
Analog input AI4	I.4.3	Physical unit		
	-11	kg/h Mass flow <not with I.4.1-6/-7>		
	-12	t/h Mass flow <not with I.4.1-6/-7>		
	-13	lb/h Mass flow <not with I.4.1-6/-7>		
	-14	% <not with I.4.1-6/-7>		
	-15	mFS Filling level <not with I.4.1-6/-7>		
	-16	mmFS Filling level <not with I.4.1-6/-7>		
	-17	inH ₂ O Filling level (inch water column) <not with I.4.1-6/-7>		
	-18	%rF Relative humidity <not with I.4.1-6/-7>		
	-19	kg/m ³ Density <not with I.4.1-6/-7>		
	-20	pH pH value <not with I.4.1-6/-7>		
	I.4.4	Input signal increase/decrease	I.4.4-0	
	-0	Off		
	-1	On		
	AI4.COR	Correction value <I.4.4-1> [-999.0 ... 9999.0]	0.0	
	I.4.5	Signal monitoring	I.4.5-0	
	-0	Off		
	-1	On		
	-2	On (with default value)		
	AI4.K1	Default value <I.4.5-2> · Initial value <I.4.1-5> [-999.0 ... 9999.0]	0.0	
	AI4.TOUT	Timeout interface <I.4.1-5, I.4.5≠0> [1 ... 99999 s]	60 s	
	I.4.6	Manual mode Controller [1] at signal error <I.4.5≠0>	I.4.6-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-1>		
	-2	Constant output value at AO2 <O.2.1-1>		
	-3	Constant output value at AO3 <O.3.1-1>		
	-4	Constant output value at SO1 <O.4.1-1>		
	-5	Constant output value at SO2 <O.5.1-1>		
	-6	With last output value <O.1.1-1/O.2.1-1/O.3.1-1/O.4.1-1/O.5.1-1>		
	AO1.K1	Constant output value at AO1 <I.4.6-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.4.6-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.4.6-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.4.6-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.4.6-5> [-10.0 ... 110.0 %]	0.0 %	
	I.4.7	Manual mode Controller [2] at signal error <M.1-5/-6, I.4.5≠0>	I.4.7-0	
	-0	Off		
	-1	Constant output value at AO1 <O.1.1-2>		

			Default setting	Setting
Analog input AI4	I.4.7	Manual mode Controller [2] at signal error		
	-2	Constant output value at AO2 <O.2.1-2>		
	-3	Constant output value at AO3 <O.3.1-2>		
	-4	Constant output value at SO1 <O.4.1-2>		
	-5	Constant output value at SO2 <O.5.1-2>		
	-6	With last output value <O.1.1-2/O.2.1-2/O.3.1-2/O.4.1-2/O.5.1-2>		
	AO1.K1	Constant output value at AO1 <I.4.7-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.K1	Constant output value at AO2 <I.4.7-2> [-10.0 ... 110.0 %]	0.0 %	
	AO3.K1	Constant output value at AO3 <I.4.7-3> [-10.0 ... 110.0 %]	0.0 %	
	SO1.K1	Constant output value at SO1 <I.4.7-4> [-10.0 ... 110.0 %]	0.0 %	
	SO2.K1	Constant output value at SO2 <I.4.7-5> [-10.0 ... 110.0 %]	0.0 %	
	I.5	Digital input DI1		
	I.5.1	Invert	I.5.1-0	
	-0	Off		
	-1	On		
	I.6	Digital input DI2		
	I.6.1	Invert	I.6.1-0	
	-0	Off		
	-1	On		
	I.7	Digital input DI3		
	I.7.1	Invert	I.7.1-0	
	-0	Off		
	-1	On		
	I.8	Digital input DI4		
	I.8.1	Invert	I.8.1-0	
	-0	Off		
	-1	On		

C Controller

Note: Controller [2] can only be selected with M.1-3/-4/-5 /-6.

			Contr.			Default setting	Setting	
							[1]	[2]
			C.1	Input variables				
Input variable PV			C.1.1	Input variable PV				
			C.1.1.1	Assign source		C.1.1.1-1		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	Analog input AI1				
	[1]	[2]	-2	Analog input AI2				
	[1]	[2]	-3	Analog input AI3				
	[1]	[2]	-4	Analog input AI4				
			C.1.1.2	Filter <C.1.1.1≠0>		C.1.1.2-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
			PV.T	Time constant <C.1.1.2-1> [0.1 ... 100.0 s]		1.0 s		
			C.1.1.3	Root extraction <C.1.1.1≠0>		C.1.1.3-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
			C.1.1.4	Function generation <C.1.1.1≠0>		C.1.1.4-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
	[1]	[2]	PV.MIN	Lower range value output function generation <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.MAX	Upper range value output function generation <C.1.1.4-1> [-999.0 ... 9999.0]		100.0		
	[1]	[2]	PV.I1	Input value 1 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.O1	Output value 1 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.I2	Input value 2 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.O2	Output value 2 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.I3	Input value 3 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.O3	Output value 3 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.I4	Input value 4 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		
	[1]	[2]	PV.O4	Output value 4 <C.1.1.4-1> [-999.0 ... 9999.0]		0.0		

		Contr.			Default setting	Setting	
		[1]	[2]			[1]	[2]
Input variable PV	[1]	[2]	PV.I5	Input value 5 <C.1.1.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	PV.O5	Output value 5 <C.1.1.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	PV.I6	Input value 6 <C.1.1.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	PV.O6	Output value 6 <C.1.1.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	PV.I7	Input value 7 <C.1.1.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	PV.O7	Output value 7 <C.1.1.4-1> [-999.0 ... 9999.0]	100.0		
			C.1.1.5	Physical unit after function generation	C.1.1.5-0		
			<C.1.1.4-1>				
	[1]	[2]	-0	Off			
	[1]	[2]	-1	°C Temperature			
	[1]	[2]	-2	°F Temperature			
	[1]	[2]	-3	K Temperature			
	[1]	[2]	-4	bar Pressure			
	[1]	[2]	-5	mbar Pressure			
	[1]	[2]	-6	psi Pressure			
	[1]	[2]	-7	kPa Pressure			
	[1]	[2]	-8	m³/h Flow rate			
	[1]	[2]	-9	l/h Flow rate			
	[1]	[2]	-10	ft³/h Flow rate			
	[1]	[2]	-11	kg/h Mass flow			
	[1]	[2]	-12	t/h Mass flow			
	[1]	[2]	-13	lb/h Mass flow			
	[1]	[2]	-14	%			
	[1]	[2]	-15	mFS Filling level			
	[1]	[2]	-16	mmFS Filling level			
	[1]	[2]	-17	inH₂O Filling level (inch water column)			
	[1]	[2]	-18	%R Relative humidity			
	[1]	[2]	-19	kg/m³ Density			
	[1]	[2]	-20	pH pH value			
			C.1.2	Input variable SPE			
			C.1.2.1	Assign source	C.1.2.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Analog input AI1			
	[1]	[2]	-2	Analog input AI2			
	[1]	[2]	-3	Analog input AI3			
	[1]	[2]	-4	Analog input AI4			

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
Input variable SPE	[1]	[2]	C.1.2.2	Filter <C.1.2.1≠0>	C.1.2.2-0		
	[1]	[2]		Off			
	[1]	[2]		On			
	[1]	[2]	SPE.T	Time constant <C.1.2.2-1> [0.1 ... 100.0 s]	1.0 s		
	[1]	[2]	C.1.2.3	Root extraction <C.1.2.1≠0>	C.1.2.3-0		
	[1]	[2]		Off			
	[1]	[2]		On			
	[1]	[2]	C.1.2.4	Function generation <C.1.2.1≠0>	C.1.2.4-0		
	[1]	[2]		Off			
	[1]	[2]		On			
	[1]	[2]	SPE.MIN	Lower range value output function generation <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.MAX	Upper range value output function generation <C.1.2.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	SPE.I1	Input value 1 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O1	Output value 1 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I2	Input value 2 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O2	Output value 2 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I3	Input value 3 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O3	Output value 3 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I4	Input value 4 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O4	Output value 4 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I5	Input value 5 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O5	Output value 5 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I6	Input value 6 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.O6	Output value 6 <C.1.2.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	SPE.I7	Input value 7 <C.1.2.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	SPE.O7	Output value 7 <C.1.2.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	C.1.2.5	Physical unit after function generation <C.1.2.4-1>	C.1.2.5-0		
	[1]	[2]		Off			
	[1]	[2]		°C Temperature			
	[1]	[2]		°F Temperature			
	[1]	[2]		K Temperature			
	[1]	[2]		bar Pressure			

			Contr.			Default setting	Setting	
							[1]	[2]
Input variable SPE			C.1.2.5	Physical unit after function generation				
	[1]	[2]	-5	mbar	Pressure			
	[1]	[2]	-6	psi	Pressure			
	[1]	[2]	-7	kPa	Pressure			
	[1]	[2]	-8	m³/h	Flow rate			
	[1]	[2]	-9	l/h	Flow rate			
	[1]	[2]	-10	ft³/h	Flow rate			
	[1]	[2]	-11	kg/h	Mass flow			
	[1]	[2]	-12	t/h	Mass flow			
	[1]	[2]	-13	lb/h	Mass flow			
	[1]	[2]	-14	%				
	[1]	[2]	-15	mFS	Filling level			
	[1]	[2]	-16	mmFS	Filling level			
	[1]	[2]	-17	inH₂O	Filling level (inch water column)			
	[1]	[2]	-18	%rF	Relative humidity			
	[1]	[2]	-19	kg/m³	Density			
	[1]	[2]	-20	pH	pH value			

			C.1.3	Input variable DV				
Input variable DV			C.1.3.1	Assign source		C.1.3.1-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	Analog input AI1				
	[1]	[2]	-2	Analog input AI2				
	[1]	[2]	-3	Analog input AI3				
	[1]	[2]	-4	Analog input AI4				
			C.1.3.2	Filter <C.1.3.1≠0>		C.1.3.2-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
	[1]	[2]	DV.T	Time constant	<C.1.3.2-1> [0.1 ... 100.0 s]	1.0 s		
			C.1.3.3	Root extraction <C.1.3.1≠0>		C.1.3.3-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
			C.1.3.4	Function generation <C.1.3.1≠0>		C.1.3.4-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
	[1]	[2]	DV.MIN	Lower range value output function generation	<C.1.3.4-1> [-999.0 ... 9999.0]	0.0		

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
Input variable DV	[1]	[2]	DV.MAX	Upper range value output function generation <C.1.3.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	DV.I1	Input value 1 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O1	Output value 1 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I2	Input value 2 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O2	Output value 2 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I3	Input value 3 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O3	Output value 3 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I4	Input value 4 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O4	Output value 4 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I5	Input value 5 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O5	Output value 5 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I6	Input value 6 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.O6	Output value 6 <C.1.3.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	DV.I7	Input value 7 <C.1.3.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	DV.O7	Output value 7 <C.1.3.4-1> [-999.0 ... 9999.0]	100.0		
			C.1.3.5	Physical unit after function generation	C.1.3.5-0		
			<C.1.3.4-1>				
	[1]	[2]	-0	Off			
	[1]	[2]	-1	°C Temperature			
	[1]	[2]	-2	°F Temperature			
	[1]	[2]	-3	K Temperature			
	[1]	[2]	-4	bar Pressure			
	[1]	[2]	-5	mbar Pressure			
	[1]	[2]	-6	psi Pressure			
	[1]	[2]	-7	kPa Pressure			
	[1]	[2]	-8	m³/h Flow rate			
	[1]	[2]	-9	l/h Flow rate			
	[1]	[2]	-10	ft³/h Flow rate			
	[1]	[2]	-11	kg/h Mass flow			
	[1]	[2]	-12	t/h Mass flow			
	[1]	[2]	-13	lb/h Mass flow			
	[1]	[2]	-14	%			
	[1]	[2]	-15	mFS Filling level			
	[1]	[2]	-16	mmFS Filling level			
	[1]	[2]	-17	inH₂O Filling level (inch water column)			
	[1]	[2]	-18	%rF Relative humidity			

Contr.				Default setting	Setting	
					[1]	[2]
		C.1.3.5	Physical unit after function generation			
[1]	[2]	-19	kg/m ³ Density			
[1]	[2]	-20	pH pH value			

Input variable TR			C.1.4	Input variable TR		
			C.1.4.1	Assign source	C.1.4.1-0	
	[1]	[2]	-0	Off		
	[1]	[2]	-1	Analog input AI1		
	[1]	[2]	-2	Analog input AI2		
	[1]	[2]	-3	Analog input AI3		
	[1]	[2]	-4	Analog input AI4		
			C.1.4.2	Filter <C.1.4.1≠0>	C.1.4.2-0	
	[1]	[2]	-0	Off		
	[1]	[2]	-1	On		
	[1]	[2]	TR.T	Time constant <C.1.4.2-1> [0.1 ... 100.0 s]	1.0 s	
			C.1.4.3	Root extraction <C.1.4.1≠0>	C.1.4.3-0	
	[1]	[2]	-0	Off		
	[1]	[2]	-1	On		
			C.1.4.4	Function generation <C.1.4.1≠0>	C.1.4.4-0	
	[1]	[2]	-0	Off		
	[1]	[2]	-1	On		
	[1]	[2]	TR.MIN	Lower range value output function generation <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.MAX	Upper range value output function generation <C.1.4.4-1> [-999.0 ... 9999.0]	100.0	
	[1]	[2]	TR.I1	Input value 1 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.O1	Output value 1 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.I2	Input value 2 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.O2	Output value 2 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.I3	Input value 3 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.O3	Output value 3 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.I4	Input value 4 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.O4	Output value 4 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.I5	Input value 5 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	
	[1]	[2]	TR.O5	Output value 5 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0	

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
Input variable TR	[1]	[2]	TR.I6	Input value 6 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	TR.O6	Output value 6 <C.1.4.4-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	TR.I7	Input value 7 <C.1.4.4-1> [-999.0 ... 9999.0]	100.0		
	[1]	[2]	TR.O7	Output value 7 <C.1.4.4-1> [-999.0 ... 9999.0]	100.0		
			C.1.4.5	Physical unit after function generation <C.1.4.4-1>	C.1.4.5-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	°C Temperature			
	[1]	[2]	-2	°F Temperature			
	[1]	[2]	-3	K Temperature			
	[1]	[2]	-4	bar Pressure			
	[1]	[2]	-5	mbar Pressure			
	[1]	[2]	-6	psi Pressure			
	[1]	[2]	-7	kPa Pressure			
	[1]	[2]	-8	m³/h Flow rate			
	[1]	[2]	-9	l/h Flow rate			
	[1]	[2]	-10	ft³/h Flow rate			
	[1]	[2]	-11	kg/h Mass flow			
	[1]	[2]	-12	t/h Mass flow			
	[1]	[2]	-13	lb/h Mass flow			
	[1]	[2]	-14	%			
	[1]	[2]	-15	mFS Filling level			
	[1]	[2]	-16	mmFS Filling level			
	[1]	[2]	-17	inH₂O Filling level (inch water column)			
	[1]	[2]	-18	%rF Relative humidity			
	[1]	[2]	-19	kg/m³ Density			
	[1]	[2]	-20	pH pH value			

			C.1.5	Input variable FB			
Input variable FB			C.1.5.1	Assign source	C.1.5.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Analog input AI1			
	[1]	[2]	-2	Analog input AI2			
	[1]	[2]	-3	Analog input AI3			
	[1]	[2]	-4	Analog input AI4			
			C.1.5.2	Filter <C.1.5.1≠0>	C.1.5.2-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			
	[1]	[2]	FB.T	Time constant <C.1.5.2-1> [0.1 ... 100 s]	1.0 s		

		Contr.			Default setting	Setting	
			C.2	Set point		[1]	[2]
Set point adjustment			C.2.1	Set point adjustment			
			C.2.1.1	Number of internal set points	C.2.1.1-1		
	[1]	[2]	-1	1			
	[1]	[2]	-2	2			
	[1]	[2]	-3	3			
	[1]	[2]	-4	4			
	[1]	[2]	SP1	Internal set point [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP1.MIN	Set point lower limit [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP1.MAX	Set point upper limit [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	100.0		
	[1]	[2]	SP2	Set point <C.2.1.1-2/-3/-4> [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP2.MIN	Set point lower limit <C.2.1.1-1> [1] <M.1-2/6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP2.MAX	Set point upper limit <C.2.1.1-1> [1] <M.1-2/6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	100.0		
	[1]	[2]	SP3	Set point <C.2.1.1-3/-4> [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP3.MIN	Set point lower limit <C.2.1.1-3/-4> [-999.0 ... 9999.0] [1] <M.1-2/-6>: [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP3.MAX	Set point upper limit <C.2.1.1-3/-4> [-999.0 ... 9999.0] [1] <M.1-2/-6>: [0.0 ... 9999.0]	100.0		
	[1]	[2]	SP4	Set point <C.2.1.1-4> [1] <M.1-2/-6>: [-999.0 ... 9999.0] [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP4.MIN	Set point lower limit <C.2.1.1-4> [-999.0 ... 9999.0] [1] <M.1-2/-6>: [0.0 ... 9999.0]	0.0		
	[1]	[2]	SP4.MAX	Set point upper limit <C.2.1.1-4> [-999.0 ... 9999.0] [1] <M.1-2/-6>: [0.0 ... 9999.0]	100.0		

		Contr.			Default setting	Setting	
						[1]	[2]
Set point adjustment			C.2.1.2	External set point	C.2.1.2-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Via input variable SPE <C.1.2.1≠0>			
	[1]	[2]	-2	Via interface SPC; only with M.1-3 Controller [2]			
	[1]		SPC.K1	Initial value <C.2.1.2-2> [-999.0 ... 9999.0] Default value <C.2.1.6-2>	0.0		
			C.2.1.3	Ratio formula <M.1-2/-6>	C.2.1.3-1		
	[1]		-1	$(PV / DV) * K11$			
	[1]		-2	$(PV / (PV + DV * K13)) * K11$			
	[1]		-3	$((PV + DV * K13) / PV) * K11$			
	[1]		-4	Universal formula $(PV * K12 + DV * K13 + TR * K14) * K11$ $(PV * K22 + DV * K23 + TR * K24)$			
	[1]		K11	Factor [0.0 ... 9999.0]	1.0		
	[1]		K12	Factor for PV <C.2.1.3-4> [-999.0 ... 9999.0]	1.00		
	[1]		K13	Factor for DV <C.2.1.3≠1> [-999.0 ... 9999.0]	1.00		
	[1]		K14	Factor for TR <C.2.1.3-4> [-999.0 ... 9999.0]	1.00		
	[1]		K22	Factor for PV <C.2.1.3-4> [-999.0 ... 9999.0]	1.00		
	[1]		K23	Factor for DV <C.2.1.3-4> [-999.0 ... 9999.0]	0.00		
	[1]		K24	Factor for TR <C.2.1.3-4> [-999.0 ... 9999.0]	0.00		
			C.2.1.4	Decimal point for set points	C.2.1.4-1		
	[1]	[2]	-0	XXXX No decimal place			
	[1]	[2]	-1	XXX.X 1 decimal place			
	[1]	[2]	-2	XX.XX 2 decimal places			
	[1]	[2]	-3	X.XXX 3 decimal places			
			C.2.1.5	Physical unit SP	C.2.1.5-1		
	[1]	[2]	-0	Off	The unit is already set depending on PV.		
	[1]	[2]	-1	°C Temperature			
	[1]	[2]	-2	°F Temperature			
	[1]	[2]	-3	K Temperature			
	[1]	[2]	-4	bar Pressure			
	[1]	[2]	-5	mbar Pressure			
	[1]	[2]	-6	psi Pressure			
	[1]	[2]	-7	kPa Pressure			
	[1]	[2]	-8	m³/h Flow rate			
	[1]	[2]	-9	l/h Flow rate			
	[1]	[2]	-10	ft³/h Flow rate			
	[1]	[2]	-11	kg/h Mass flow			

		Contr.			Default setting	Setting	
		[1]	[2]			[1]	[2]
Set point adjustment				C.2.1.5	Physical unit for set points		
	[1]	[2]	-12	t/h	Mass flow		
	[1]	[2]	-13	lb/h	Mass flow		
	[1]	[2]	-14	%			
	[1]	[2]	-15	mFS	Filling level		
	[1]	[2]	-16	mmFS	Filling level		
	[1]	[2]	-17	inH ₂ O	Filling level (inch water column)		
	[1]	[2]	-18	%rF	Relative humidity		
	[1]	[2]	-19	kg/m ³	Density		
	[1]	[2]	-20	pH	pH value		
				C.2.1.6	Signal monitoring SPC <C.2.1.2-2>	C.2.1.6-0	
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			
	[1]	[2]	-2	On (with default value)			
	[1]	[2]	SPC.K1	Default value <C.2.1.6-1/-2> [-999.0 ... 9999.0] Initial value <C.2.1.2-2>	0.0		
	[1]	[2]	SPC.TOUT	Timeout interface <C.2.1.6-1/-2> [1 ... 99999 s]	60 s		
				C.2.1.7	Manual mode controller at signal error SPC <C.2.1.6≠0>	C.2.1.7-0	
	[1]	[2]	-0	Off			
	[1]		-1	Constant output value at AO1 <O.1.1-1/-38/-39>			
	[1]		-2	Constant output value at AO2 <O.2.1-1/-38/-39>			
	[1]		-3	Constant output value at AO3 <O.3.1-1/-38/-39>			
	[1]		-4	Constant output value at SO1 <O.4.1-1/-38/-39>			
	[1]		-5	Constant output value at SO2 <O.5.1-1/-38/-39>			
	[1]		-6	With last output value <O.1.1-1/-38/-39/O.2.1-1/-38/-39/ O.3.1-1/-38/-39/O.4.1-1/-38/-39/O.5.1-1/-38/-39>			
	[2]		-1	Constant output value at AO1 <O.1.1-2/-38/-39>			
	[2]		-2	Constant output value at AO2 <O.2.1-2/-38/-39>			
	[2]		-3	Constant output value at AO3 <O.3.1-2/-38/-39>			
	[2]		-4	Constant output value at SO1 <O.4.1-2/-38/-39>			
	[2]		-5	Constant output value at SO2 <O.5.1-2/-38/-39>			
	[2]		-6	With last output value <O.1.1-2/-38/-39/O.2.1-2/-38/-39/ O.3.1-2/-38/-39/O.4.1-2/-38/-39/O.5.1-2/-38/-39>			
	[1]	[2]	AO1.K1	Constant output value at AO1 <C.2.1.7-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	AO2.K1	Constant output value at AO2 <C.2.1.7-2> [-10.0 ... 110.0 %]	0.0 %		

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
	[1]	[2]	AO3.K1	Constant output value at AO3 [-10.0 ... 110.0 %] <C.2.1.7-3>	0.0 %		
	[1]	[2]	SO1.K1	Constant output value at SO1 [-10.0 ... 110.0 %] <C.2.1.7-4>	0.0 %		
	[1]	[2]	SO2.K1	Constant output value at SO2 [-10.0 ... 110.0 %] <C.2.1.7-5>	0.0 %		

Changeover set points			C.2.2	Changeover set points			
			C.2.2.1	Changeover internal set points with DI	C.2.2.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	SP1/SP2 with DI1 <C.2.1.1-2>			
	[1]	[2]	-2	SP1/SP2 with DI2 <C.2.1.1-2>			
			C.2.2.1	Changeover internal set points with DI			
	[1]	[2]	-3	SP1/SP2 with DI3 <C.2.1.1-2>			
	[1]	[2]	-4	SP1/SP2 with DI4 <C.2.1.1-2>			
	[1]	[2]	-5	SP1...SP4 with DI1, DI2 <C.2.1.1-4>			
	[1]	[2]	-6	SP1...SP4 with DI3, DI4 <C.2.1.1-4>			
[1]	[2]	-7	SP1...SP3 with DI2, DI3 <C.2.1.1-3>				
[1]	[2]	-8	SP1...SP4 with DI2, 3, 4 <C.2.1.1-4>				
			C.2.2.2	Changeover to external set point with DI <C.2.1.2≠0>; M.1-3: Controller [2] only	C.2.2.2-0		
[1]	[2]	-0	Off				
[1]	[2]	-1	With digital input DI1				
[1]	[2]	-2	With digital input DI2				
[1]	[2]	-3	With digital input DI3				
[1]	[2]	-4	With digital input DI4				
			C.2.2.3	Open cascade with DI <M.1-3>	C.2.2.3-0		
[1]		-0	Off				
[1]		-1	With digital input DI1				
[1]		-2	With digital input DI2				
[1]		-3	With digital input DI3				
[1]		-4	With digital input DI4				
			C.2.2.4	Tracking SPI to SPE/SPC <C.2.1.2≠0>	C.2.2.4-0		
[1]	[2]	-0	Off				
[1]	[2]	-1	On				

		Contr.			Default setting	Setting	
						[1]	[2]
Changeover set points			C.2.2.5	Incremental/decremental set point change	C.2.2.5-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1, 2			
	[1]	[2]	-2	With digital input DI3, 4			
	[1]	[2]	K10.A	Incremental value [-999.0 ... 9999.0] <C.2.2.4≠0>	0.0		
	[1]	[2]	K10.B	Decremental value [-999.0 ... 9999.0] <C.2.2.4≠0>	0.0		
			C.2.2.6	Set point increase/decrease by constant	C.2.2.6-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
[1]	[2]	-3	With digital input DI3				
[1]	[2]	-4	With digital input DI4				
[1]	[2]	K10	Incremental/decremental value <C.2.2.6≠0> [-999.0 ... 9999.0]	0.0			

			C.2.3	Set point ramp function			
Set point ramp function			C.2.3.1	Set point ramp	C.2.3.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Start with DI1, SP=PV			
	[1]	[2]	-2	Start with DI2, SP=PV			
	[1]	[2]	-3	Start with DI3, SP=PV			
	[1]	[2]	-4	Start with DI4, SP=PV			
	[1]	[2]	-5	Start with DI1, SP=SP.ST			
	[1]	[2]	-6	Start with DI2, SP=SP.ST			
	[1]	[2]	-7	Start with DI3, SP=SP.ST			
	[1]	[2]	-8	Start with DI4, SP=SP.ST			
	[1]	[2]	-9	Continuously active			
	[1]	[2]	SP.GD	Gradient <C.2.3.1≠0> [0.0 ... 9999.0]	1.0		
	[1]	[2]	SP.TB	Time base <C.2.3.1≠0> [s, min, h]	s		
	[1]	[2]	SP.ST	Initial set point value <C.2.3.1-5/-6/-7/-8> [-999.0 ... 9999.0]	0.0		
[1]	[2]	SP.RH	Hold set point ramp at deviation band <C.2.3.1≠0> Up to firmware version 1.11:	[0.1 ... 1000.0 %] [0.1 ... 100.0 %]	1000.0 % 100.0 %		

Contr.				Default setting	Setting	
					[1]	[2]
		C.2.3.2	Hold set point ramp with DI <C.2.3.1≠0>	C.2.3.2-0		
[1]	[2]	-0	Off			
[1]	[2]	-1	With digital input DI1			
[1]	[2]	-2	With digital input DI2			
[1]	[2]	-3	With digital input DI3			
[1]	[2]	-4	With digital input DI4			

Additional set point functions		C.2.4	Additional set point functions			
		C.2.4.1	Valuate external set point SPE <C.2.1.2≠0>	C.2.3.2-0		
	[1]	[2]	-0 Off			
	[1]	[2]	-1 On			
	[1]	[2]	K1 Valuation $SPE' = SPE * K1 + K2$ <C.2.4.1-1> [-100.0 ... 100.00]	1.00		
	[1]	[2]	K2 Valuation $SPE' = SPE * K1 + K2$ <C.2.4.1-1> [-9999.0 ... 9999.0]	0.0		
		C.2.4.2	Linking up external/internal set point <C.2.1.2≠0>	C.2.4.2-0		
	[1]	[2]	-0 Off			
	[1]	[2]	-1 Min. selection (SPI, SPE)			
	[1]	[2]	-2 Max. selection (SPI, SPE)			
	[1]	[2]	-3 SPI + SPE			
	[1]	[2]	-4 SPI – SPE			
	[1]	[2]	-5 SPE – SPI			
		C.2.4.3	Function generation set point SPM at slave controller <M.1-3>	C.2.4.3-0		
	[1]		-0 Off			
	[1]		-1 On			
	[1]	SPM.I1	Input value 1 <C.2.4.3-1> [0.0 ... 100.0 %]	0.0 %		
	[1]	SPM.O1	Output value 1 <C.2.4.3-1> [-999.0 ... 9999.0]	0.0		
	[1]	SPM.I2	Input value 2 <C.2.4.3-1> [0.0 ... 100.0 %]	0.0 %		
	[1]	SPM.O2	Output value 2 <C.2.4.3-1> [-999.0 ... 9999.0]	0.0		
	[1]	SPM.I3	Input value 3 <C.2.4.3-1> [0.0 ... 100.0 %]	0.0 %		
	[1]	SPM.O3	Output value 3 <C.2.4.3-1> [-999.0 ... 9999.0]	0.0		
	[1]	SPM.I4	Input value 4 <C.2.4.3-1> [0.0 ... 100.0 %]	0.0 %		
	[1]	SPM.O4	Output value 4 <C.2.4.3-1> [-999.0 ... 9999.0]	0.0		
	[1]	SPM.I5	Input value 5 <C.2.4.3-1> [0.0 ... 100.0 %]	0.0 %		

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
	[1]		SPM.05	Output value 5 <C.2.4.3-1>	[-999.0 ... 9999.0]	0.0	
	[1]		SPM.I6	Input value 6 <C.2.4.3-1>	[0.0 ... 100.0 %]	0.0 %	
	[1]		SPM.06	Output value 6 <C.2.4.3-1>	[-999.0 ... 9999.0]	0.0	
	[1]		SPM.I7	Input value 7 <C.2.4.3-1>	[0.0 ... 100.0 %]	0.0 %	
	[1]		SPM.07	Output value 7 <C.2.4.3-1>	[-999.0 ... 9999.0]	100.0	

[1]	[2]	C.3	Control function			
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			C.3.1	Control behavior				
Control behavior			C.3.1.1	Control algorithm		C.3.1.1-1		
	[1]	[2]	-1	PI				
	[1]	[2]	-2	P				
	[1]	[2]	-3	PD				
	[1]	[2]	-4	PID				
	[1]	[2]	-5	I				
	[1]	[2]	KP	Proportional-action coefficient [0.01 ... 100.0]		1.00		
	[1]	[2]	TN	Reset time <C.3.1.1-1/-4/-5> [1 ... 9999 s]		120 s		
	[1]	[2]	TV	Derivative-action time <C.3.1.1-3/-4> [1 ... 9999 s]		10 s		
	[1]	[2]	Y0	Operating point [-10.0 ... 110.0 %]		0.0 %		
	[1]	[2]	TV.K	Derivative-action gain <C.3.1.1-3/-4> [0.00 ... 10.00]		1.00		
			C.3.1.2	Limit I-component <C.3.1.1-1/-4/-5>		C.3.1.2-0		
	[1]	[2]	-0	Off				
	[1]	[2]	-1	On				
	[1]	[2]	I.MIN	Minimum I-component [-120.0 ... 0.0 %] <C.3.1.2-1>		-100.0 %		
	[1]	[2]	I.MAX	Maximum I-component <C.3.1.2-1> [0.0 ... 120.0 %]		100.0 %		
			C.3.1.3	Error signal		C.3.1.3-1		
	[1]	[2]	-1	Not inverted				
	[1]	[2]	-2	Inverted				
	[1]	[2]	-3	Inverted via DI1				
	[1]	[2]	-4	Inverted via DI2				
	[1]	[2]	-5	Inverted via DI3				
	[1]	[2]	-6	Inverted via DI4				
	[1]	[2]	E.TZ	Operating threshold [0.0 ... 110.0 %]		0.0 %		

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
Control behavior	[1]	[2]	E.MIN	Min. effective error signal [-110.0 ... 110.0 %]	-110.0 %		
	[1]	[2]	E.MAX	Max. effective error signal [-110.0 ... 110.0 %]	110.0 %		
	[1]	[2]	C.3.1.4	Assign D-component <C.3.1.1-3/-4>	C.3.1.4-1		
	[1]	[2]	-1	To error signal			
	[1]	[2]	-2	To controlled variable			
	[1]	[2]	C.3.1.5	Control mode changeover P(D)/PI(D) <C.3.1.1-1/-4>	C.3.1.5-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
	[1]	[2]	-5	By error signal			
	[1]	[2]	E.SMIN	Min. limit for PI(D) behavior <C.3.1.5-5> [-999.0 ... 999.0 %]	-10.0 %		
	[1]	[2]	E.SMAX	Max. limit for PI(D) behavior <C.3.1.5-5> [-999.0 ... 999.0 %]	10.0 %		
	[1]	[2]	KP.S	Prop.-action coefficient for P(D) behavior <C.3.1.5≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	C.3.1.6	Function generation KP	C.3.1.6-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With set point SP0			
	[1]	[2]	-2	With actual value PVO			
	[1]	[2]	-3	With error signal +/-e			
	[1]	[2]	-4	With output AO1			
	[1]	[2]	-5	With output AO2			
	[1]	[2]	-6	With output AO3			
	[1]	[2]	-7	With output SO1			
	[1]	[2]	-8	With output SO2			
	[1]	[2]	FKP.I1	Input value 1 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O1	Output value 1 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FKP.I2	Input value 2 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O2	Output value 2 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FKP.I3	Input value 3 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O3	Output value 3 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FKP.I4	Input value 4 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O4	Output value 4 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		

	Contr.				Default setting	Setting	
						[1]	[2]
Control behavior	[1]	[2]	FKP.I5	Input value 5 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O5	Output value 5 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FKP.I6	Input value 6 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O6	Output value 6 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FKP.I7	Input value 7 <C.3.1.6≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FKP.O7	Output value 7 <C.3.1.6≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	C.3.1.7	Function generation TN <C.3.1.1-1/-4/-5>	C.3.1.7-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With set point SP0			
	[1]	[2]	-2	With actual value PV0			
	[1]	[2]	-3	With error signal +/-e			
	[1]	[2]	-4	With output AO1			
	[1]	[2]	-5	With output AO2			
	[1]	[2]	-6	With output AO3			
	[1]	[2]	-7	With output SO1			
	[1]	[2]	-8	With output SO2			
	[1]	[2]	FTN.I1	Input value 1 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O1	Output value 1 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I2	Input value 2 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O2	Output value 2 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I3	Input value 3 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O3	Output value 3 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I4	Input value 4 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O4	Output value 4 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I5	Input value 5 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O5	Output value 5 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I6	Input value 6 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O6	Output value 6 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	FTN.I7	Input value 7 <C.3.1.7≠0> [-999.0 ... 9999.0]	0.00		
	[1]	[2]	FTN.O7	Output value 7 <C.3.1.7≠0> [0.01 ... 100.0]	1.00		
	[1]	[2]	C.3.1.8	Set operating point by set point	C.3.1.8-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			
	[1]	[2]	OP.I1	Input value 1 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		

	Contr.				Default setting	Setting	
	[1]	[2]				[1]	[2]
Control behavior	[1]	[2]	OP.O1	Output value 1 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I2	Input value 2 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O2	Output value 2 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I3	Input value 3 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O3	Output value 3 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I4	Input value 4 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O4	Output value 4 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I5	Input value 5 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O5	Output value 5 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I6	Input value 6 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O6	Output value 6 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	OP.I7	Input value 7 <C.3.1.6-1> [-999.0 ... 9999.0]	0.0		
	[1]	[2]	OP.O7	Output value 7 <C.3.1.6-1> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	C.3.1.9	Operating point 1 with DI	C.3.1.9-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
	[1]	[2]	Y0.1	Operating point 1 [-110.0 ... 110.0 %] <C.3.1.9≠0>	0.0 %		
	[1]	[2]	C.3.1.10	Operating point 2 with DI	C.3.1.10-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
	[1]	[2]	Y0.2	Operating point 2 [-110.0 ... 110.0 %] <C.3.1.10≠0>	0.0 %		
	[1]		C.3.1.11	Internally controlled output limitation <M.1-4>	C.3.1.11-1		
	[1]		-1	Minimum selection			
	[1]		-2	Maximum selection			
	[1]		OC.K1	Limiting band [0.1 ... 110.0 %] master controller	5.0 %		

		Contr.			Default setting	Setting	
		[1]				[1]	[2]
		[1]		OC.K2	Limiting band override controller [0.1 ... 110.0 %]	5.0 %	
Feedforward control			C.3.2	Feedforward control			
			C.3.2.1	Link input variable SPE	C.3.2.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	To input variable PV			
	[1]	[2]	-2	To inputs DV, TR M.1-2/-6 Controller [1]: To input TR			
			C.3.2.2	Valuate input variable SPE <C.3.2.1≠0>	C.3.2.2-1		
	[1]	[2]	-1	Result pos./neg.			
	[1]	[2]	-2	Result >= 0			
	[1]	[2]	-3	Result <= 0			
	[1]	[2]	K3	Constant, formula: SPE * K3 + K4 [-100.00 ... 100.00]	1.00		
	[1]	[2]	K4	Constant, formula: SPE * K3 + K4 [-9999.0 ... 9999.0]	0.0		
			C.3.2.3	Link input variables DV, TR M.1-2/-6 Controller [1]: Link input variable TR	C.3.2.3-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	To input variable PV			
	[1]	[2]	-2	To set point SP			
	[1]	[2]	-3	To output YPID			
	[1]		-5	To input variable DV <M.1-2/-6>			
			C.3.2.4	Valuate input variable DV, TR <C.3.2.3≠0> M.1-2: Link input variable TR	C.3.2.4-1		
	[1]	[2]	-1	Result pos./neg.			
	[1]	[2]	-2	Result >= 0			
	[1]	[2]	-3	Result <= 0			
	[1]	[2]	K5	Constant, formula: [-100.0 ... 100.0] (DV + TR * K5 - K6) * K7 + K8 M.1-2/-6 Controller [1]: without DV	0.00		
	[1]	[2]	K6	Constant, formula: [-9999.0 ... 9999.0] (DV + TR * K5 - K6) * K7 + K8 M.1-2/-6 Controller [1]: without DV	0.0		

Contr.				Default setting	Setting	
					[1]	[2]
[1]	[2]	K7	Constant, formula: $[-100.0 \dots 100.0]$ (DV + TR* K5 – K6)* K7 + K8 M.1-2/-6 Controller [1]: without DV	1.00		
[1]	[2]	K8	Constant, formula: $[-9999.0 \dots 9999.0]$ (DV + TR* K5 – K6)* K7 + K8 M.1-2/-6 Controller [1]: without DV	0.0		
		C.3.2.5	Transfer function for disturbance variables <C.3.2.3≠0>	C.3.2.5-1		
[1]	[2]	-1	P behavior			
[1]	[2]	-2	D behavior1			
[1]	[2]	-3	D behavior2			
[1]	[2]	-4	D behavior3			
[1]	[2]	-5	PD behavior			

		Contr.			Default setting	Setting	
		[1]	[2]			[1]	[2]
Feedforward control	[1]	[2]	KP.PD	Proportional-action coefficient [0.1 ...100.0]	1.0		
	[1]	[2]	TV.PD	Derivative-action time [0.1 ... 9999 s] <C.3.2.5≠1>	0.1 s		
	[1]	[2]	B.MIN	Minimum output value [-9999.0 ... 9999.0]	-9999.0 %		
	[1]	[2]	B.MAX	Maximum output value [-9999.0 ... 9999.0]	9999.0 %		
			C.3.2.6	Arithmetic operation input variable PV	C.3.2.6-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	PV + A <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-2	PV – A <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-3	PV * A <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-4	PV / A <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-5	(PV + A) / 2 <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-6	Min (PV, A) <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-7	Max (PV, A) <C.1.1.1-1/-2/-3/-4, C.3.2.1-1/C.3.2.3-1>			
	[1]	[2]	-8	PV – SPE <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4>			
	[1]	[2]	-9	(PV + SPE) / 2 <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4>			
	[1]	[2]	-10	Min (PV, SPE) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4>			
	[1]	[2]	-11	Max (PV, SPE) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4>			
	[1]	[2]	-12	PV – DV <C.1.1.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-13	(PV + DV) / 2 <C.1.1.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-14	Min (PV, DV) <C.1.1.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-15	Max (PV, DV) <C.1.1.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-16	(PV + SPE + DV) / 3 <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-17	Min (PV, SPE, DV) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			

		Contr.			Default setting	Setting	
						[1]	[2]
Feedforward control	[1]	[2]	C.3.2.6	Arithmetic operation input variable PV Max (PV, SPE, DV) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4>			
	[1]	[2]	-18				
	[1]	[2]	-19	(PV + SPE + DV + TR) / 4 <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4, C.1.4.1-1/-2/-3/-4>			
	[1]	[2]	-20	Min (PV, SPE, DV, TR) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4, C.1.4.1-1/-2/-3/-4>			
	[1]	[2]	-21	Max (PV, SPE, DV, TR) <C.1.1.1-1/-2/-3/-4, C.1.2.1-1/-2/-3/-4, C.1.3.1-1/-2/-3/-4, C.1.4.1-1/-2/-3/-4>			
	[1]		C.3.2.7	Arithmetic operation input variable DV <M.1-2/-6, C.3.2.3-5>	C.3.2.7-0		
	[1]		-0	Off			
	[1]		-1	DV + B			
	[1]		-2	DV – B			
	[1]		-3	DV * B			
	[1]		-4	DV / B			
	[1]	[2]	C.3.2.8	Arithmetic operation set point SP <C.3.2.3-2>	C.3.2.8-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	SP + B			
	[1]	[2]	-2	SP – B			
	[1]	[2]	-3	SP * B			
	[1]	[2]	-4	SP / B			
	[1]	[2]	C.3.2.9	Arithmetic operation output YPID <C.3.2.3-3>	C.3.2.9-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	YPID + B			
	[1]	[2]	-2	YPID – B			
	[1]	[2]	-3	YPID * B			
	[1]	[2]	-4	YPID / B			

		Contr.			Default setting	Setting	
						[1]	[2]
Additional control functions			C.3.3	Additional control functions			
			C.3.3.1	Change over to manual mode DI M.1-3/-4: Controller [1] only	C.3.3.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
			C.3.3.2	Hold output YPID with DI	C.3.3.2-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
			C.3.3.3	Output tracking <C.1.4.1-1/-2/-3/-4> M.1-1/-2/-3/-4/-5/-6; M1-4: Controller [1] only	C.3.3.3-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With input TR, DI1			
	[1]	[2]	-2	With input TR, DI2			
	[1]	[2]	-3	With input TR, DI3			
	[1]	[2]	-4	With input TR, DI4			
			C.3.3.6	Increase/decrease actual value with DI	C.3.3.6-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	With digital input DI1			
	[1]	[2]	-2	With digital input DI2			
	[1]	[2]	-3	With digital input DI3			
	[1]	[2]	-4	With digital input DI4			
	[1]	[2]	K9	Constant for actual value increase/decrease [-999.0 ... 9999.0]	0.0		
			C.3.3.7	Limit output in manual mode M.1-3/-4: Controller [1] only	C.3.3.7-1		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			

			Contr.			Default setting	Setting	
							[1]	[2]
Additional control functions			C.3.3.8	Limit master controller output YM <M.1-3>		C.3.3.8-0		
		[2]	-0	Off				
		[2]	-1	Min/Max value = constant				
		[2]	-2	Minimum value = f(SP0)				
			C.3.3.8	Limit master controller output YM				
		[2]	-3	Maximum value = f(SP0)				
		[2]	-4	Min/Max value = f(SP0)				
		[2]	YM.MIN	Minimum value output master controller <C.3.3.8≠0>	[-10.0 ... 110.0 %]	0.0 %		
		[2]	YM.MAX	Max. value output master controller <C.3.3.8≠0>	[-10.0 ... 110.0 %]	100.0 %		
		[2]	YM.K1	Constant minimum value = SP - YM.K1 <C.3.3.8-2/-4>	[0.0 ... 100.0 %]	100.0 %		
		[2]	YM.K2	Constant maximum value = SP + YM.K2 <C.3.3.8-3/-4>	[0.0 ... 100.0 %]	100.0 %		
Restart condition			C.4	Restart condition				
			C.4.1	Operation mode after restart		C.4.1-0		
	[1]	[2]	-0	Auto		with M.1-3/-4 the follow- ing always applies for Controller [2]: C.4.1-0		
	[1]	[2]	-1	Auto, start AO1 = AO1.K1 <O.1.1-1/-2/-38/-39>				
	[1]	[2]	-2	Auto, start AO2 = AO2.K1 <O.2.1-1/-2/-38/-39>				
	[1]	[2]	-3	Auto, start AO3 = AO3.K1 <O.3.1-1/-2/-38/-39>				
	[1]	[2]	-4	Auto, start SO1 = SO1.K1 <O.4.1-1/-2/-38/-39>				
	[1]	[2]	-5	Auto, start SO2 = SO2.K1 <O.5.1-1/-2/-38/-39>				
	[1]	[2]	-6	Manual, start AO1=AO1.K1 <O.1.1-1/-2/-38/-39>				
	[1]	[2]	-7	Manual, start AO2=AO2.K1 <O.2.1-1/-2/-38/-39>				
	[1]	[2]	-8	Manual, start AO3=AO3.K1 <O.3.1-1/-2/-38/-39>				
	[1]	[2]	-9	Manual, start SO1=SO1.K1 <O.4.1-1/-2/-38/-39>				
	[1]	[2]	-10	Manual, start SO2=SO2.K2 <O.5.1-1/-2/-38/-39>				
	[1]	[2]	-11	Auto, confirm. AO1=AO1.K1 <O.1.1-1/-2/-38/-39>				
	[1]	[2]	-12	Auto, confirm. AO2=AO2.K1 <O.2.1-1/-2/-38/-39>				
	[1]	[2]	-13	Auto, confirm. AO3=AO3.K1 <O.3.1-1/-2/-38/-39>				
	[1]	[2]	-14	Auto, confirm. SO1=SO1.K1 <O.4.1-1/-2/-38/-39>				
	[1]	[2]	-15	Auto, confirm. SO2=SO2.K1 <O.5.1-1/-2/-38/-39>				
	[1]	[2]	AO1.K1	Constant output value at AO1 <C.4.1-1/-6/-11>	[-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	AO2.K1	Constant output value at AO2 <C.4.1-2/-7/-12>	[-10.0 ... 110.0 %]	0.0 %		

	Contr.				Default setting	Setting	
						[1]	[2]
	[1]	[2]	AO3.K1	Constant output value at AO3 <C.4.1-3/-8/-13> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	SO1.K1	Constant output value at SO1 <C.4.1-4/-9/-14> [-10.0 ... 110.0 %]	0.0 %		
	[1]	[2]	SO2.K1	Constant output value at SO2 <C.4.1-5/-10/-15> [-10.0 ... 110.0 %]	0.0 %		

		C.5	Controller display			
Controller display			C.5.1	Row 1		
	[1]	[2]	-1	Actual value PV0 at comparator	C.5.1-1	
	[1]	[2]	-2	Input PV after function generation	Ratio controller:	
	[1]	[2]	-3	Input PV before filter	C.5.1-4	
	[1]		-4	Actual ratio PVR <M.1-2/-6>		
			C.5.2	Row 2	C.5.2-1	
	[1]	[2]	-0	Off		
	[1]	[2]	-1	Error signal +/- e		
	[1]	[2]	-2	Error signal e		
			C.5.3	Row 3	C.5.3-1	
	[1]	[2]	-1	SP1 ... SP4, SPE, SPC · SPM with M.1-3 Controller [2]	Ratio controller:	
	[1]	[2]	-2	Set point SPO at comparator	C.5.3-3	
	[1]		-3	Ratio set point SPR <M.1-2/-6>		

Contr.				Default setting	Setting	
					[1]	[2]
		C.5.4	Row 4	C.5.4-1		
[1]	[2]	-0	Off			
[1]	[2]	-1	Output according to priority			
[1]	[2]	-2	Output AO1 <0.1.1≠0>			
[1]	[2]	-3	Output AO2 <0.2.1≠0>			
[1]	[2]	-4	Output AO3 <0.3.1≠0>			
[1]	[2]	-5	Output SO1 <0.4.1≠0>			
[1]	[2]	-6	Output SO2 <0.5.1≠0>			
[1]		-7	Controller [1] output Y			
	[2]	-8	Controller [2] output Y			
	[2]	-10	Output master controller YM <M.1-3>			
[1]	[2]	-11	Input PV before filter <C.1.1.1≠0>			
[1]	[2]	-12	Input PV after function generation <C.1.1.1≠0>			
[1]	[2]	-13	Actual value PV0 at comparator <C.1.1.1≠0>			
[1]		-14	Actual ratio PVR <M.1-2/-6>			
[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			
[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
[1]	[2]	-23	Input FB after Filter <C.1.5.1≠0>			
[1]	[2]	-24	Signal A <C.3.2.1≠0/C.3.2.3≠0>			
[1]	[2]	-25	Signal B <C.3.2.3≠0>			
[1]	[2]	-26	Set point SP1 <C.2.1.1-1/-2/-3/-4>			

		Contr.			Default setting	Setting	
						[1]	[2]
Controller display			C.5.4	Row 4			
	[1]	[2]	-27	Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]	-28	Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]	-29	Set point SP4 <C.2.1.1-4>			
	[1]	[2]	-30	Set point SPI			
	[1]		-31	Set point SPM <M.1-3>			
	[1]	[2]	-32	Set point SPC <C.2.1.2-2>			
	[1]	[2]	-33	Set point SP			
	[1]	[2]	-34	Set point SP0 at comparator			
	[1]		-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4 <O.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]	[2]	-38	Digital outputs DO5 ... 7			
	[1]	[2]	-39	Digital inputs DI1 ... 4			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			
			C.5.5	Row 4 representation	C.5.5-1		
	[1]	[2]	-1	Numerical	C.5.5-5, if		
	[1]	[2]	-2	Numerical, inverted	C.5.4-5/-6		
	[1]	[2]	-3	Bar graph	is set		
	[1]	[2]	-4	Bar graph, inverted	C.5.5-6, if		
	[1]	[2]	-5	Switch signal	C.5.4-37/-		
	[1]	[2]	-6	Digital signal	38/-39 is		
			C.5.6	Row 5	C.5.6-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Output according to priority			
	[1]	[2]	-2	Output AO1 <O.1.1≠0>			
	[1]	[2]	-3	Output AO2 <O.2.1≠0>			
	[1]	[2]	-4	Output AO3 <O.3.1≠0>			
	[1]	[2]	-5	Output SO1 <O.4.1≠0>			
	[1]	[2]	-6	Output SO2 <O.5.1≠0>			
	[1]		-7	Controller [1] output Y			
		[2]	-8	Controller [2] output Y			
		[2]	-10	Output master controller YM <M.1-3>			
	[1]	[2]	-11	Input PV before filter <C.1.1.1≠0>			
	[1]	[2]	-12	Input PV after function generation <C.1.1.1≠0>			
	[1]	[2]	-13	Actual value PV0 at comparator <C.1.1.1≠0>			
	[1]		-14	Actual ratio PVR <M.1-2/-6>			
	[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			

		Contr.			Default setting	Setting	
						[1]	[2]
Controller display	[1]	[2]	C.5.6	Row 5			
	[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
	[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
	[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
	[1]	[2]	-23	Input FB after filter <C.1.5.1≠0>			
	[1]	[2]	-24	Signal A <C.3.2.1≠0/C.3.2.3≠0>			
	[1]	[2]	-25	Signal B <C.3.2.3≠0>			
	[1]	[2]	-26	Set point SP1 <C.2.1.1-1/-2/-3/-4>			
	[1]	[2]	-27	Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]	-28	Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]	-29	Set point SP4 <C.2.1.1-4>			
	[1]	[2]	-30	Set point SPI			
	[1]	[2]	-31	Set point SPM <M.1-3>			
	[1]	[2]	-32	Set point SPC <C.2.1.2-2>			
	[1]	[2]	-33	Set point SP			
	[1]	[2]	-34	Set point SP0 at comparator			
	[1]	[2]	-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4 <O.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]	[2]	-38	Digital outputs DO5 ... 7			
	[1]	[2]	-39	Digital inputs DI1 ... 4			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			
	[1]	[2]	C.5.7	Row 5 representation	C.5.7-1		
	[1]	[2]	-1	Numerical	C.5.7-5, if		
	[1]	[2]	-2	Numerical, inverted	C.5.6-5/-6		
	[1]	[2]	-3	Bar graph	is set		
	[1]	[2]	-4	Bar graph, inverted	C.5.7-6,		
	[1]	[2]	-5	Switch signal	if C.5.6-37		
	[1]	[2]	-6	Digital signal	/-38/-39 is set		
			C.6	Additional display			
			C.6.1	Row 1	C.6.1-1		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Output according to priority			
	[1]	[2]	-2	Output AO1 <O.1.1≠0>			

		Contr.			Default setting	Setting	
						[1]	[2]
Additional display			C.6.1	Row 1			
	[1]	[2]	-3	Output AO2 <0.2.1≠0>			
	[1]	[2]	-4	Output AO3 <0.3.1≠0>			
	[1]	[2]	-5	Output SO1 <0.4.1≠0>			
	[1]	[2]	-6	Output SO2 <0.5.1≠0>			
	[1]		-7	Controller [1] output Y			
		[2]	-8	Controller [2] output Y			
	[2]		-10	Output master controller YM <M.1-3>			
	[1]	[2]	-11	Input PV before filter <C.1.1.1≠0>			
	[1]	[2]	-12	Input PV after function generation <C.1.1.1≠0>			
	[1]	[2]	-13	Actual value PVO at comparator <C.1.1.1≠0>			
	[1]		-14	Actual ratio PVR <M.1-2/-6>			
	[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			
	[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
	[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
	[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
	[1]	[2]	-23	Input FB after filter <C.1.5.1≠0>			
	[1]	[2]	-24	Signal A <C.3.2.1≠0/C.3.2.3≠0>			
	[1]	[2]	-25	Signal B <C.3.2.3≠0>			
	[1]	[2]	-26	Set point SP1 <C.2.1.1-1/-2/-3/-4>			
	[1]	[2]	-27	Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]	-28	Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]	-29	Set point SP4 <C.2.1.1-4>			
	[1]	[2]	-30	Set point SPI			
	[1]		-31	Set point SPM <M.1-3>			
	[1]	[2]	-32	Set point SPC <C.2.1.2-2>			
	[1]	[2]	-33	Set point SP			
	[1]	[2]	-34	Set point SPO at comparator			
	[1]		-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4 <0.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]	[2]	-38	Digital outputs DO5 ... 7			
	[1]	[2]	-39	Digital inputs DI1 ... 4			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			

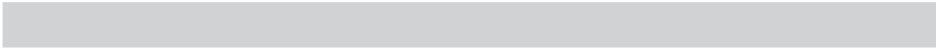
	Contr.				Default setting	Setting	
						[1]	[2]
Additional display	[1]	[2]	C.6.2	Row 1 representation <C.6.1≠0>	C.6.2-1 C.6.2-5, if C.6.1-5/-6 is set C.6.2-6, if C.6.1-37 /-38/-39 is set		
	[1]	[2]		Numerical			
	[1]	[2]		Numerical, inverted			
	[1]	[2]		Bar graph			
	[1]	[2]		Bar graph, inverted			
	[1]	[2]		Switch signal			
	[1]	[2]		Digital signal			
			C.6.3	Row 2	C.6.3-1		
	[1]	[2]		-0 Off			
	[1]	[2]		-1 Output according to priority			
	[1]	[2]		-2 Output AO1 <O.1.1≠0>			
	[1]	[2]		-3 Output AO2 <O.2.1≠0>			
	[1]	[2]		-4 Output AO3 <O.3.1≠0>			
	[1]	[2]		-5 Output SO1 <O.4.1≠0>			
	[1]	[2]		-6 Output SO2 <O.5.1≠0>			
	[1]			-7 Controller [1] output Y			
		[2]		-8 Controller [2] output Y			
		[2]		-10 Output master controller YM <M.1-3>			
	[1]	[2]		-11 Input PV before filter <C.1.1.1≠0>			
	[1]	[2]		-12 Input PV after function generation <C.1.1.1≠0>			
	[1]	[2]		-13 Actual value PV0 at comparator <C.1.1.1≠0>			
	[1]			-14 Actual ratio PVR <M.1-2/-6>			
	[1]	[2]		-15 Input SPE before filter <C.1.2.1≠0>			
	[1]	[2]		-16 Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]		-17 Input DV before filter <C.1.3.1≠0>			
	[1]	[2]		-18 Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]		-19 Input TR before filter <C.1.4.1≠0>			
	[1]	[2]		-20 Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]		-22 Input FB before filter <C.1.5.1≠0>			
	[1]	[2]		-23 Input FB after filter <C.1.5.1≠0>			
	[1]	[2]		-24 Signal A <C.3.2.1≠0/C.3.2.3≠0>			
	[1]	[2]		-25 Signal B <C.3.2.3≠0>			
	[1]	[2]		-26 Set point SP1 <C.2.1.1-1/-2/-3/-4>			
	[1]	[2]		-27 Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]		-28 Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]		-29 Set point SP4 <C.1.1.1-4>			
	[1]	[2]		-30 Set point SPI			
	[1]			-31 Set point SPM <M.1-3>			
	[1]	[2]		-32 Set point SPC <C.2.1.2-2>			
	[1]	[2]		-33 Set point SP			

		Contr.			Default setting	Setting	
						[1]	[2]
Additional display			C.6.3	Row 2			
	[1]	[2]	-34	Set point SPO at comparator			
	[1]		-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4 <O.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]						
	[1]	[2]	-38	Digital outputs DO5 ... 7			
		[2]	-39	Digital inputs DI1 ... 4			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			
			C.6.4	Row 2 representation <C.6.3≠0>	C.6.4-1		
	[1]	[2]	-1	Numerical	C.6.4-5, if		
	[1]	[2]	-2	Numerical, inverted	C.6.3-5/-6		
	[1]	[2]	-3	Bar graph	is set		
	[1]	[2]	-4	Bar graph, inverted	C.6.4-6 if		
	[1]	[2]	-5	Switch signal	C.6.3-37/-		
	[1]	[2]	-6	Digital signal	38/-39 is set		
			C.6.5	Row 3	C.6.5-1		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Output according to priority			
	[1]	[2]	-2	Output AO1 <O.1.1≠0>			
	[1]	[2]	-3	Output AO2 <O.2.1≠0>			
	[1]	[2]	-4	Output AO3 <O.3.1≠0>			
	[1]	[2]	-5	Output SO1 <O.4.1≠0>			
	[1]	[2]	-6	Output SO2 <O.5.1≠0>			
	[1]		-7	Controller [1] output Y			
		[2]	-8	Controller [2] output Y			
		[2]	-10	Output master controller YM <M.1-3>			
	[1]	[2]	-11	Input PV before filter <C.1.1.1≠0>			
	[1]	[2]	-12	Input PV after function generation <C.1.1.1≠0>			
	[1]	[2]	-13	Actual value PVO at comparator <C.1.1.1≠0>			
	[1]		-14	Actual ratio PVR <M.1-2/-6>			
	[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			
	[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
	[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
	[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
	[1]	[2]	-23	Input FB after filter <C.1.5.1≠0>			

	Contr.				Default setting	Setting	
						[1]	[2]
Additional display	[1] [2]	[2]	C.6.5	Row 3			
				Signal A <C.3.2.1≠0/C.3.2.3≠0>			
				Signal B <C.3.2.3≠0>			
				Set point SP1 <C.2.1.1-1/-2/-3/-4>			
				Set point SP2 <C.2.1.1-2/-3/-4>			
				Set point SP3 <C.2.1.1-3/-4>			
				Set point SP4 <C.2.1.1-4>			
				Set point SPI			
				Set point SPM <M.1-3>			
				Set point SPC <C.2.1.2-2>			
				Set point SP			
				Set point SP0 at comparator			
				Ratio set point SPR <M.1-2/-6>			
				Error signal +/-e			
				Digital outputs DO1 ... 4			
				<O.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
				Digital outputs DO5 ... 7			
				Digital inputs DI1 ... 4			
				Effective KP			
				Effective TN			
	[1] [2]	[2]	C.6.6	Row 3 representation <C.6.5≠0>	C.6.6-1 C.6.6-5, if C.6.5-5/-6 is set C.6.6-6, if C.6.5-37/- 38/-39 is set		
				Numerical			
				Numerical, inverted			
				Bar graph			
				Bar graph, inverted			
				Switch signal			
				Digital signal			
	[1] [2]	[2]	C.6.7	Row 4	C.6.7-1		
				Off			
				Output according to priority			
				Output AO1 <O.1.1≠0>			
				Output AO2 <O.2.1≠0>			
				Output AO3 <O.3.1≠0>			
				Output SO1 <O.4.1≠0>			
				Output SO2 <O.5.1≠0>			
				Controller [1] output Y			
				Controller [2] output Y			
				Output master controller YM <M.1-3>			
				Input PV before filter <C.1.1.1≠0>			
				Input PV after function generation <C.1.1.1≠0>			

		Contr.			Default setting	Setting	
						[1]	[2]
Additional display			C.6.7	Row 4			
	[1]	[2]	-13	Actual value PV0 at comparator <C.1.1.1≠0>			
	[1]		-14	Actual ratio PVR <M.1-2/-6>			
	[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			
	[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
	[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
	[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
	[1]	[2]	-23	Input FB after filter <C.1.5.1≠0>			
	[1]	[2]	-24	Signal A <C.3.2.1≠0/C.3.2.3≠0>			
	[1]	[2]	-25	Signal B <C.3.2.3≠0>			
	[1]	[2]	-26	Set point SP1 <C.2.1.1-1/-2/-3/-4>			
	[1]	[2]	-27	Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]	-28	Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]	-29	Set point SP4 <C.2.1.1-4>			
	[1]	[2]	-30	Set point SPI			
	[1]		-31	Set point SPM <M.1-3>			
	[1]	[2]	-32	Set point SPC <C.2.1.2-2>			
	[1]	[2]	-33	Set point SP			
	[1]	[2]	-34	Set point SPO at comparator			
	[1]		-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4			
		[2]		<O.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]		-38	Digital outputs DO5 ... 7			
	[1]	[2]	-39	Digital inputs DI1 ... 4			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			
			C.6.8	Row 4 representation <C.6.7≠0>	C.6.8-1		
	[1]	[2]	-1	Numerical	C.6.8-5, if		
	[1]	[2]	-2	Numerical, inverted	C.6.7-5/-6		
	[1]	[2]	-3	Bar graph	is set		
	[1]	[2]	-4	Bar graph, inverted	C.6.8-6, if		
	[1]	[2]	-5	Switch signal	C.6.7-37/-		
	[1]	[2]	-6	Digital signal	38/-39 is		
					set		

		Contr.			Default setting	Setting	
						[1]	[2]
Additional display			C.6.9	Row 5	C.6.9-1		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	Output according to priority			
	[1]	[2]	-2	Output AO1 <0.1.1≠0>			
	[1]	[2]	-3	Output AO2 <0.2.1≠0>			
	[1]	[2]	-4	Output AO3 <0.3.1≠0>			
	[1]	[2]	-5	Output SO1 <0.4.1≠0>			
	[1]	[2]	-6	Output SO2 <0.5.1≠0>			
	[1]		-7	Controller [1] output Y			
		[2]	-8	Controller [2] output Y			
		[2]	-10	Output master controller YM <M.1-3>			
	[1]	[2]	-11	Input PV before filter <C.1.1.1≠0>			
	[1]	[2]	-12	Input PV after function generation <C.1.1.1≠0>			
	[1]	[2]	-13	Actual value PV0 at comparator <C.1.1.1≠0>			
	[1]		-14	Actual ratio PVR <M.1-2/-6>			
	[1]	[2]	-15	Input SPE before filter <C.1.2.1≠0>			
	[1]	[2]	-16	Input SPE after function generation <C.1.2.1≠0>			
	[1]	[2]	-17	Input DV before filter <C.1.3.1≠0>			
	[1]	[2]	-18	Input DV after function generation <C.1.3.1≠0>			
	[1]	[2]	-19	Input TR before filter <C.1.4.1≠0>			
	[1]	[2]	-20	Input TR after function generation <C.1.4.1≠0>			
	[1]	[2]	-22	Input FB before filter <C.1.5.1≠0>			
	[1]	[2]	-23	Input FB after filter <C.1.5.1≠0>			
	[1]	[2]	-24	Signal A <C.3.2.1≠0/C.3.2.3≠0>			
	[1]	[2]	-25	Signal B <C.3.2.3≠0>			
	[1]	[2]	-26	Set point SP1 <C.2.1.1-1/-2/-3/-4>			
	[1]	[2]	-27	Set point SP2 <C.2.1.1-2/-3/-4>			
	[1]	[2]	-28	Set point SP3 <C.2.1.1-3/-4>			
	[1]	[2]	-29	Set point SP4 <C.2.1.1-4>			
	[1]	[2]	-30	Set point SPI			
	[1]		-31	Set point SPM <M.1-3>			
	[1]	[2]	-32	Set point SPC <C.2.1.2-2>			
	[1]	[2]	-33	Set point SP			
	[1]	[2]	-34	Set point SP0 at comparator			
	[1]		-35	Ratio set point SPR <M.1-2/-6>			
	[1]	[2]	-36	Error signal +/-e			
	[1]	[2]	-37	Digital outputs DO1 ... 4 <0.6.1≠0/O.7.1≠0/O.8.1≠0/O.9.1≠0>			
	[1]	[2]	-38	Digital outputs DO5 ... 7			
	[1]	[2]	-39	Digital inputs DI1 ... 4			



Additional display			C.6.9	Row 5			
	[1]	[2]	-40	Effective KP			
	[1]	[2]	-41	Effective TN			
			C.6.10	Row 5 representation <C.6.9≠0>	C.6.10-1		
	[1]	[2]	-0	Off	C.6.10-5,		
	[1]	[2]	-1	Numerical	if		
	[1]	[2]	-2	Numerical, inverted	C.6.9-5/-6		
	[1]	[2]	-3	Bar graph	is set		
	[1]	[2]	-4	Bar graph, inverted	C.6.10-6,		
	[1]	[2]	-5	Switch signal	if C.6.9-37		
	[1]	[2]	-6	Digital signal	/-38/-39 is set		

			C.7	Operator keys			
Operator keys			C.7.1	Invert manual output value	C.7.1-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			
			C.7.2	Lock manual/auto key	C.7.2-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			
			C.7.3	Lock set point keys	C.7.3-0		
	[1]	[2]	-0	Off			
	[1]	[2]	-1	On			

			Default setting	Setting
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O Output

			Default setting	Setting
	O.1	Analog output AO1		
Analog output AO1	O.1.1	Assign source	O.1.1-1	
	-0	Off		
	-1	Controller [1] output Y		
	-2	Controller [2] output Y <M.1-3/-4/-5/-6>		
	-4	Constant output value		
	-5	[1] Input PV before filter <1C.1.1.1≠0>		
	-6	[1] Input PV after function generation <1C.1.1.1≠0>		
	-7	[1] Actual value PVO <1C.1.1.1≠0>		
	-8	[1] Input SPE before filter <1C.1.2.1≠0>		
	-9	[1] Input SPE after function generation <1C.1.2.1≠0>		
	-10	[1] Input DV before filter <1C.1.3.1≠0>		
	-11	[1] Input DV after function generation <1C.1.3.1≠0>		
	-12	[1] Input TR before filter <1C.1.4.1≠0>		
	-13	[1] Input TR after function generation <1C.1.4.1≠0>		
	-14	[1] Input FB before filter <1C.1.5.1≠0>		
	-15	[1] Signal A <1C.3.2.1-1/1C.3.2.3-1>		
	-16	[1] Signal B <1C.3.2.3≠0>		
	-17	[1] Set point SPO		
	-18	[1] Error signal +/-e		
	-19	[1] Error signal e		
	-20	[1] Ratio set point SPR <M.1-2/-6>		
	-21	[1] Actual ratio PVR <M.1-2/-6>		
	-22	[2] Input PV before filter <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-23	[2] Input PV after function generation <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-24	[2] Actual value PVO <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-25	[2] Input SPE before filter <M.1-3/-4/-5/-6, 2C.1.2.1≠0>		
	-26	[2] Input SPE after function generation <M.1-3/-4/-5/-6, 2C.1.2.1≠0>		
	-27	[2] Input DV before filter <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-28	[2] Input DV after function generation <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-29	[2] Input TR before filter <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-30	[2] Input TR after function generation <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-31	[2] Input FB before filter <M.1-3/-4/-5/-6, 2C.1.5.1≠0>		
	-32	[2] Signal A <M.1-3/-4/-5/-6, 2C.3.2.1-1, 2C.3.2.3-1>		
	-33	[2] Signal B <M.1-3/-4/-5/-6, 2C.3.2.3≠0>		
	-34	[2] Set point SPO <M.1-3/-4/-5/-6>		

			Default setting	Setting
Analog output AO1	O.1.1	Assign source		
	-35	[2] Error signal +/−e <M.1-3/-4/-5/-6>		
	-36	[2] Error signal e <M.1-3/-4/-5/-6>		
	-37	Output master controller YM <M.1-3>		
	-38	$Y1 * Y2 * AO1.KM/100$ <M.1-5/-6>		
	-39	$(100 - Y1) * Y2 * AO1.KM/100$ <M.1-5/-6>		
	AO1.FX	Constant output value <O.1.1-4> [−10.0 ... 110.0 %]	0.0 %	
	AO1.KM	Constant, mixing operation <O.1.1-38/-39> [0.0 ... 100.0]	1.0	
	O.1.2	Output signal <O.1.1≠0>	O.1.2-1	
	-1	4–20 mA		
	-2	0–20 mA		
	-3	0–10 V		
	-4	2–10 V		
	AO1.MIN	Minimum output value [−10.0 ... 110.0 %]	0.0 %	
	AO1.MAX	Maximum output value [−10.0 ... 110.0 %]	100.0 %	
	O.1.3	Operating direction <O.1.1≠0>	O.1.3-1	
	-1	Increasing		
	-2	Decreasing		
	AO1.P1	Y value for AO1=AO1.MIN <O.1.3-1> [−10.0 ... 110.0 %] Y value for AO1=AO1.MAX <O.1.3-2> The default value of AO1.P1 is the same as AO1.MIN. If AO1.MIN is changed, AO1.P1 is set to AO1.MIN.	0.0 %	
	AO1.P2	Y value for AO1 = AO1.MAX <O.1.3-1> [−10.0 ... 110.0 %] Y value for AO1 = AO1.MIN <O.1.3-2> The default value of AO1.P2 is the same as AO1.MAX. If AO1.MAX is changed, AO1.P2 is set to AO1.MAX.	100.0 %	
	O.1.4	Output ramp <O.1.1≠0, O.1.5-0>	C.1.4-0	
	-0	Off		
	-1	Start with DI1		
	-2	Start with DI2		
	-3	Start with DI3		
	-4	Start with DI4		
	AO1.GD	Gradient <O.1.4≠0> [0.1 ... 100.0 %]	1.0 %	
	AO1.TB	Time base <O.1.4≠0> [s, min, h]	s	
	AO1.ST	Initial value <O.1.4≠0> [−10.0 ... 110.0 %]	0.0 %	
	O.1.5	Limit output rate <O.1.1≠0, O.1.4-0>	O.1.5-0	
	-0	Off		
	-1	Increasing, continuously active		

			Default setting	Setting
Analog output AO1	O.1.5	Limit output rate		
	-2	Decreasing, continuously active		
	-3	Increasing and decreasing		
	-4	Increasing, start with DI1		
	-5	Increasing, start with DI2		
	-6	Increasing, start with DI3		
	-7	Increasing, start with DI4		
	-8	Decreasing, start with DI1		
	-9	Decreasing, start with DI2		
	-10	Decreasing, start with DI3		
	-11	Decreasing, start with DI4		
	AO1.GD1	Gradient for increasing output signal <O.1.5-1/-3/-4/-5/-6/-7> [0.1 ... 100.0 %]	1.0 %	
	AO1.GD2	Gradient for decreasing output signal <O.1.5-2/-3/-8/-9/-10/-11> [0.1 ... 100.0 %]	1.0 %	
	AO1.TB2	Time base <O.1.5≠0> [s, min, h]	s	
	O.1.6	Constant output value 1 with DI (auto mode) <O.1.1≠0>	O.1.6-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	AO1.K1	Constant output value 1 <O.1.6≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.1.7	Constant output value 2 with DI (man/auto) <O.1.1≠0>	O.1.7-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	AO1.K2	Constant output value 2 <O.1.7≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.1.8	Limit output by input TR <O.1.1≠0>	O.1.8-0	
	-0	Off		
	-1	To minimum value		
	-2	To maximum value		
	O.1.9	Function generation <O.1.1≠0>	O.1.9-0	
	-0	Off		
	-1	Free adjustment		
	-2	Equal percentage		
	-3	Equal percentage inverse		

			Default setting	Setting
Analog output AO1	AO1.I1	Input value 1 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O1	Output value 1 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I2	Input value 2 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O2	Output value 2 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I3	Input value 3 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O3	Output value 3 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I4	Input value 4 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O4	Output value 4 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I5	Input value 5 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O5	Output value 5 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I6	Input value 6 <0.1.9-1>	[-9999.0 ... 9999.0]	0.0
	AO1.O6	Output value 6 <0.1.9-1>	[-10.0 ... 110.0 %]	0.0 %
	AO1.I7	Input value 7 <0.1.9-1>	[-9999.0 ... 9999.0]	100.0
	AO1.O7	Output value 7 <0.1.9-1>	[-10.0 ... 110.0 %]	100.0 %

			Default setting	Setting
	O.2	Analog output AO2		
Analog output AO2	O.2.1	Assign source	O.2.1-0	
	-0	Off		
	-1	Controller [1] output Y		
	-2	Controller [2] output Y <M.1-3/-4/-5/-6>		
	-4	Constant output value		
	-5	[1] Input PV before filter <1C.1.1.1≠0>		
	-6	[1] Input PV after function generation <1C.1.1.1≠0>		
	-7	[1] Actual value PVO <1C.1.1.1≠0>		
	-8	[1] Input SPE before filter <1C.1.2.1≠0>		
	-9	[1] Input SPE after function generation <1C.1.2.1≠0>		
	-10	[1] Input DV before filter <1C.1.3.1≠0>		
	-11	[1] Input DV after function generation <1C.1.3.1≠0>		
	-12	[1] Input TR before filter <1C.1.4.1≠0>		
	-13	[1] Input TR after function generation <1C.1.4.1≠0>		
	-14	[1] Input FB before filter <1C.1.5.1≠0>		
	-15	[1] Signal A <1C.3.2.1≠0/1C.3.2.3≠0>		
	-16	[1] Signal B <1C.3.2.3≠0>		
	-17	[1] Set point SPO		
	-18	[1] Error signal +/-e		
	-19	[1] Error signal e		
	-20	[1] Ratio set point SPR <M.1-2/-6>		
	-21	[1] Actual ratio PVR <M.1-2/-6>		
	-22	[2] Input PV before filter <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-23	[2] Input PV after function generation <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-24	[2] Actual value PVO <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-25	[2] Input SPE before filter <M.1-3/-4/-5/-6>		
	-26	[2] Input SPE after function generation <M.1-3/-4/-5/-6, 2C.1.2.1≠0>		
	-27	[2] Input DV before filter <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-28	[2] Input DV after function generation <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-29	[2] Input TR before filter <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-30	[2] Input TR after function generation <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-31	[2] Input FB before filter <M.1-3/-4/-5/-6, 2C.1.5.1≠0>		
	-32	[2] Signal A <M.1-3/-4/-5/-6, 2C.3.2.1≠0, 2C.3.2.3≠0>		
	-33	[2] Signal B <M.1-3/-4/-5/-6, 2C.3.2.3≠0>		
	-34	[2] Set point SPO <M.1-3/-4/-5/-6>		

			Default setting	Setting
Analog output AO2	O.2.1	Assign source		
	-35	[2] Error signal +/−e <M.1-3/-4/-5/-6>		
	-36	[2] Error signal e <M.1-3/-4/-5/-6>		
	-37	Output master controller YM <M.1-3>		
	-38	$Y1 * Y2 * AO2.KM/100$ <M.1-5/-6>		
	-39	$(100 - Y1) * Y2 * AO2.KM/100$ <M.1-5/-6>		
	AO2.FX	Constant output value <O.2.1-4> [-10.0 ... 110.0 %]	0.0 %	
	AO2.KM	Constant, mixing operation <O.2.1-38/-39> [0.0 ... 100.0]	1.0	
	O.2.2	Output signal <O.2.1≠0>	0.2.2-1	
	-1	4–20 mA		
	-2	0–20 mA		
	-3	0–10 V		
	-4	2–10 V		
	AO2.MIN	Minimum output value [-10.0 ... 100.0 %]	0.0 %	
	AO2.MAX	Maximum output value [0.0 ... 110.0 %]	100.0 %	
	O.2.3	Operating direction <O.2.1≠0>	0.2.3-1	
	-1	Increasing		
	-2	Decreasing		
	AO2.P1	Y value for AO2=AO2.MIN <O.2.3-1> [-10.0 ... 110.0 %] Y value for AO2=AO2.MAX <O.2.3-2> The default value of AO2.P1 is the same as AO2.MIN. If AO2.MIN is changed, AO2.P1 is set to AO2.MIN.	0.0 %	
	AO2.P2	Y value for AO2 = AO2.MAX <O.2.3-1> [-10.0 ... 110.0 %] Y value for AO2 = AO2.MIN <O.2.3-2> The default value of AO2.P2 is the same as AO2.MAX. If AO2.MAX is changed, AO2.P2 is set to AO2.MAX.	100.0 %	
	O.2.4	Output ramp <O.2.1≠0, O.2.5-0>	0.2.4-0	
	-0	Off		
	-1	Start with DI1		
	-2	Start with DI2		
	-3	Start with DI3		
	-4	Start with DI4		
	AO2.GD	Gradient <O.2.4≠0> [0.1 ... 100.0 %]	1.0 %	
	AO2.TB	Time base <O.2.4≠0> [s, min, h]	s	
	AO2.ST	Initial value <O.2.4≠0> [-10.0 ... 110.0 %]	0.0 %	

			Default setting	Setting
Analog output AO2	O.2.5	Limit output rate <O.2.1≠0, O.2.4-0>	C.2.5-0	
	-0	Off		
	-1	Increasing, continuously active		
	-2	Decreasing, continuously active		
	-3	Increasing and decreasing		
	-4	Increasing, start with DI1		
	-5	Increasing, start with DI2		
	-6	Increasing, start with DI3		
	-7	Increasing, start with DI4		
	-8	Decreasing, start with DI1		
	-9	Decreasing, start with DI2		
	-10	Decreasing, start with DI3		
	-11	Decreasing, start with DI4		
	AO2.GD1	Gradient for increasing output signal <O.2.5-1/-3/-4/-5/-6/-7> [0.1 ... 100.0 %]	1.0 %	
	AO2.GD2	Gradient for decreasing output signal <O.2.5-2/-3/-8/-9/-10/-11> [0.1 ... 100.0 %]	1.0 %	
	AO2.TB2	Time base <O.2.5≠0> [s, min, h]	s	
	O.2.6	Constant output value 1 with DI (auto mode) <O.2.1≠0>	O.2.6-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	AO2.K1	Constant output value 1 <O.2.6≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.2.7	Constant output value 2 with DI (man/auto) <O.2.1≠0>	O.2.7-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	AO2.K2	Constant output value 2 <O.2.7≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.2.8	Limit output by input TR <O.2.1≠0>	O.2.8-0	
	-0	Off		
	-1	To minimum value		
	-2	To maximum value		

			Default setting	Setting
Analog output AO2	O.2.9	Function generation <O.2.1≠0>	O.2.9-0	
	-0	Off		
	-1	Free adjustment		
	-2	Equal percentage		
	-3	Equal percentage inverse		
	AO2.I1	Input value 1 <O.2.9-1> [-9999.0 ... 9999.0]	0.0	
	AO2.O2	Output value 1 <O.2.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.I2	Input value 2 <O.2.9-1> [-9999.0 ... 9999.0]	0.0	
	AO2.O2	Output value 2 <O.2.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.I3	Input value 3 <O.2.9-1> [-9999.0 ... 9999.0]	0.0	
	AO2.O3	Output value 3 <O.2.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.I4	Input value 4 <O.2.9-1> [-9999.0 ... 9999.0]	0.0	
	AO2.O4	Output value 4 <O.2.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO2.I5	Input value 5 <O.2.9-1> [-9999.0 ... 9999.0]	0.0	
	AO2.O5	Output value 5 <O.2.9-1> [-10.0 ... 110.0 %]	0.0 %	
Analog output AO3	O.3	Analog output AO3		
	O.3.1	Assign source	O.3.1-1	
	-0	Off		
	-1	Controller [1] output Y		
	-2	Controller [2] output Y <M.1-3/-4/-5/-6>		

			Default setting	Setting
Analog output AO3	O.3.1	Assign source		
	-4	Constant output value		
	-5	[1] Input PV before filter <1C.1.1.1≠0>		
	-6	[1] Input PV after function generation <1C.1.1.1≠0>		
	-7	[1] Actual value PVO <1C.1.1.1≠0>		
	-8	[1] Input SPE before filter <1C.1.2.1≠0>		
	-9	[1] Input SPE after function generation <1C.1.2.1≠0>		
	-10	[1] Input DV before filter <1C.1.3.1≠0>		
	-11	[1] Input DV after function generation <1C.1.3.1≠0>		
	-12	[1] Input TR before filter <1C.1.4.1≠0>		
	-13	[1] Input TR after function generation <1C.1.4.1≠0>		
	-14	[1] Input FB before filter <1C.1.5.1≠0>		
	-15	[1] Signal A <1C.3.2.1≠0/1C.3.2.3≠0>		
	-16	[1] Signal B <1C.3.2.3≠0>		
	-17	[1] Set point SPO		
	-18	[1] Error signal +/-e		
	-19	[1] Error signal e		
	-20	[1] Ratio set point SPR <M.1-2/-6>		
	-21	[1] Actual ratio PVR <M.1-2/-6>		
	-22	[2] Input PV before filter <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-23	[2] Input PV after function generation <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-24	[2] Actual value PVO <M.1-3/-4/-5/-6, 2C.1.1.1≠0>		
	-25	[2] Input SPE before filter <M.1-3/-4/-5/-6, 2C.1.2.1≠0>		
	-26	[2] Input SPE after function generation <M.1-3/-4/-5/-6, 2C.1.2.1≠0>		
	-27	[2] Input DV before filter <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-28	[2] Input DV after function generation <M.1-3/-4/-5/-6, 2C.1.3.1≠0>		
	-29	[2] Input TR before filter <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-30	[2] Input TR after function generation <M.1-3/-4/-5/-6, 2C.1.4.1≠0>		
	-31	[2] Input FB before filter <M.1-3/-4/-5/-6, 2C.1.5.1≠0>		
	-32	[2] Signal A <M.1-3/-4/-5/-6, 2C.3.2.1≠0, 2C.3.2.3≠0>		
	-33	[2] Signal B <M.1-3/-4/-5/-6, 2C.3.2.3≠0>		
	-34	[2] Set point SPO <M.1-3/-4/-5/-6>		
	-35	[2] Error signal +/-e <M.1-3/-4/-5/-6>		
	-36	[2] Error signal e <M.1-3/-4/-5/-6>		
	-37	Output master controller YM <M.1-3>		
	-38	Y1 * Y2 * AO3.KM/100 <M.1-5/-6>		
	-39	(100 - Y1) * Y2 * AO3.KM/100 <M.1-5/-6>		

			Default setting	Setting
Analog output AO3	AO3.FX	Constant output value <O.3.1-4> [-10.0 ... 110.0 %]	0.0 %	
	AO3.KM	Constant, mixing operation <O.3.1-38/-39> [0.0 ... 100.0]	1.0	
	O.3.2	Output signal <O.3.1≠0>	0.3.2-1	
	-1	4–20 mA		
	-2	0–20 mA		
	-3	0–10 V		
	-4	2–10 V		
	AO3.MIN	Minimum output value [-10.0 ... 110.0 %]	0.0 %	
	AO3.MAX	Maximum output value [-10.0 ... 110.0 %]	100.0 %	
	O.3.3	Operating direction <O.3.1≠0>	0.3.3-1	
	-1	Increasing		
	-2	Decreasing		
	AO3.P1	Y value for AO3=AO3.MIN <O.3.3-1> [-10.0 ... 110.0 %] Y value for AO3=AO3.MAX <O.3.3-2> The default value of AO3.P1 is the same as AO3.MIN. If AO3.MIN is changed, AO3.P1 is set to AO3.MIN.	0.0 %	
	AO3.P2	Y value for AO3 = AO3.MAX <O.3.3-1> [-10.0 ... 110.0 %] Y value for AO3 = AO3.MIN <O.3.3-2> The default value of AO3.P2 is the same as AO3.MAX. If AO3.MAX is changed, AO3.P2 is set to AO3.MAX.	100.0 %	
	O.3.4	Output ramp <O.3.3-1, O.3.5-0>	0.3.4-0	
	-0	Off		
	-1	Increasing, start with DI1		
	-2	Increasing, start with DI2		
	-3	Increasing, start with DI3		
	-4	Increasing, start with DI4		
	AO3.GD	Gradient <O.3.4≠0> [0.1 ... 100.0 %]	1.0 %	
	AO3.TB	Time base <O.3.4≠0> [s, min, h]	s	
	AO3.ST	Initial value <O.3.4≠0> [-10.0 ... 110.0 %]	0.0 %	

			Default setting	Setting
	O.3.5	Limit output rate <O.1.1≠0, O.3.4-0> -0 Off -1 Increasing, continuously active -2 Decreasing, continuously active -3 Increasing and decreasing -4 Increasing, start with DI1 -5 Increasing, start with DI2 -6 Increasing, start with DI3 -7 Increasing, start with DI4 -8 Decreasing, start with DI1	C.3.5-0	
Analog output AO3	O.3.5	Limit output rate -9 Decreasing, start with DI2 -10 Decreasing, start with DI3 -11 Decreasing, start with DI4		
	AO3.GD1	Gradient for increasing output signal <O.3.5-1/-3/-4/-5/-6/-7> [0.1 ... 100.0 %]	1.0 %	
	AO3.GD2	Gradient for decreasing output signal only with O.3.5-2/-3/-8/-9/-10/-11 [0.1 ... 100.0 %]	1.0 %	
	AO3.TB2	Time base <O.3.5≠0> [s, min, h]	s	
	O.3.6	Constant output value 1 with DI (auto mode) <O.3.1≠0> -0 Off -1 With digital input DI1 -2 With digital input DI2 -3 With digital input DI3 -4 With digital input DI4	O.3.6-0	
	AO3.K1	Constant output value 1 <O.3.6≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.3.7	Constant output value 2 with DI (man/auto) <O.3.1≠0> -0 Off -1 With digital input DI1 -2 With digital input DI2 -3 With digital input DI3 -4 With digital input DI4	O.3.7-0	
	AO3.K2	Constant output value 2 <O.3.7≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.3.8	Limit output by input TR <O.3.1≠0> -0 Off -1 To minimum value -2 To maximum value	O.3.8-0	

			Default setting	Setting
Analog output AO3	O.3.9	Function generation <O.3.1≠0> -0 Off -1 Free adjustment -2 Equal percentage -3 Equal percentage inverse	O.3.9-0	
	AO3.I1	Input value 1 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O1	Output value 1 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I2	Input value 2 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O2	Output value 2 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I3	Input value 3 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O3	Output value 3 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I4	Input value 4 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O4	Output value 4 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I5	Input value 5 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O5	Output value 5 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I6	Input value 6 <O.3.9-1> [-9999.0 ... 9999.0]	0.0	
	AO3.O6	Output value 6 <O.3.9-1> [-10.0 ... 110.0 %]	0.0 %	
	AO3.I7	Input value 7 <O.3.9-1> [-9999.0 ... 9999.0]	100.0	
	AO3.O7	Output value 7 <O.3.9-1> [-10.0 ... 110.0 %]	100.0 %	

			Default setting	Setting
	0.4	Switch output SO1		
Switch output SO1	0.4.1	Assign source	0.4.1-0	
	-0	Off		
	-1	Controller [1] output Y		
	-2	Controller [2] output Y <M.1-3/-4/-5/-6>		
	-38	Y1 * Y2 * SO1.KM/100 <M.1-5/-6>		
	-39	(100 - Y1) * Y2 * SO1.KM/100 <M.1-5/-6>		
	SO1.KM	Constant, mixing operation <0.4.1-38/-39> [0.0 ... 100.0]	1.0	
	0.4.2	Output signal DO1/DO2 <0.4.1≠0>	0.4.2-0	
	-0	Off		
	-1	3-step with internal feedback		
Switch output SO1	-2	3-step with external feedback		
	-3	On-off PWM "+" display		
	-4	On-off PWM "-" display		
	-5	3-step PWM with internal feedback		
	-6	3-step PWM with external feedback		
	SO1.TY	Transit time <0.4.2-1/-5> [10 ... 1000 s]	60 s	
	SO1.TZ	Dead zone <0.4.2≠0> [0.1 ... 100.0 %]	2.0 %	
	SO1.SW	Increment <0.4.2-1/-2> [1 ... 4]	1	
	SO1.P+	Duty cycle (+) signal <0.4.2-3/-4/-5/-6> [1.0 ... 1000.0 s]	10.0 s	
	SO1.P-	Duty cycle (-) signal <0.4.2-5/-6> [1.0 ... 1000.0 s]	10.0 s	
	SO1.TMIN+	Minimum on-time (+) signal <0.4.2-3/-4/-5/-6> [0.1 ... 100.0 %]	1.0 %	
	SO1.TMIN-	Minimum on-time (-) signal <0.4.2-5/-6> [0.1 ... 100.0 %]	1.0 %	
	SO1.TMAX+	Maximum on-time (+) signal <0.4.2-3/-4/-5/-6> [0.1 ... 100.0 %]	100.0 %	
	SO1.TMAX-	Maximum on-time (-) signal <0.4.2-5/-6> [0.1 ... 100.0 %]	100.0 %	
	SO1.MIN	Minimum output value <0.4.2≠0> [0.0 ... 100.0 %]	0.0 %	
	SO1.MAX	Maximum output value <0.4.2≠0> [0.0 ... 100.0 %]	100.0 %	
	0.4.3	Operating direction <0.4.1≠0>	0.4.3-1	
	-1	Increasing		
	-2	Decreasing		
	SO1.P1	Y value for SO1=SO1.MIN <0.4.3-1> [0.0 ... 100.0 %] Y value for SO1=SO1.MAX <0.4.3-2> The default value of SO1.P1 is the same as SO1.MIN. If SO1.MIN is changed, SO1.P1 is set to SO1.MIN.	0.0 %	

			Default setting	Setting
Switch output SO1	SO1.P2	Y value for SO1 = SO1.MAX <0.4.3-1> [0.0 ... 100.0 %] Y value for SO1 = SO1.MIN <0.4.3-2> The default value of SO1.P2 is the same as SO1.MAX. If SO1.MAX is changed, SO1.P2 is set to SO1.MAX.	100.0 %	
	0.4.4	Output ramp <0.4.1≠0>	0.4.4-0	
	-0	Off		
	-1	Start with DI1		
	-2	Start with DI2		
	-3	Start with DI3		
	-4	Start with DI4		
	SO1.GD	Gradient <0.4.4≠0> [0.1 ... 100.0 %]	1.0 %	
	SO1.TB	Time base <0.4.4≠0> [s, min, h]	s	
	SO1.ST	Initial value <0.4.4≠0> [-10.0 ... 110.0 %]	0.0 %	
	0.4.6	Constant output value 1 with DI (auto mode) <0.4.1≠0>	0.4.6-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	SO1.K1	Constant output value 1 <0.4.6≠0> [-10.0 ... 110.0 %]	0.0 %	
	0.4.7	Constant output value 2 with DI (man/auto) <0.4.1≠0>	0.4.7-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	SO1.K2	Constant output value 2 <0.4.7≠0> [-10.0 ... 110.0 %]	0.0 %	
	0.4.8	Limit output by input TR <0.4.1≠0>	0.4.8-0	
	-0	Off		
	-1	To minimum value		
	-2	To maximum value		
	0.4.9	Function generation <0.4.1≠0>	0.4.9-0	
	-0	Off		
	-1	Free adjustment		
	-2	Equal percentage		
	-3	Equal percentage inverse		
	SO1.I1	Input value 1 <0.4.9-1> [-10.0 ... 110.0 %]	0.0 %	
	SO1.O1	Output value 1 <0.4.9-1> [-10.0 ... 110.0 %]	0.0 %	

			Default setting	Setting
	SO1.I2	Input value 2 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.O2	Output value 2 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.I3	Input value 3 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.O3	Output value 3 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.I4	Input value 4 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.O4	Output value 4 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.I5	Input value 5 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.O5	Output value 5 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.I6	Input value 6 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.O6	Output value 6 <O.4.9-1>	[-10.0 ... 110.0 %]	0.0 %
	SO1.I7	Input value 7 <O.4.9-1>	[-10.0 ... 110.0 %]	100.0 %
	SO1.O7	Output value 7 <O.4.9-1>	[-10.0 ... 110.0 %]	100.0 %

	0.5	Switch output SO2		
Switch output SO2	0.5.1	Assign source	0.5.1-0	
	-0	Off		
	-1	Controller [1] output Y		
	-2	Controller [2] output Y <M.1-3/-4/-5/-6>		
	-38	Y1 * Y2 * SO2.KM/100 <M.1-5/-6>		
	-39	(100 - Y1) * Y2 * SO2.KM/100 <M.1-5/-6>		
	SO2.KM	Constant, mixing operation <O.5.1-38/-39> [0.0 ... 100.0]	1.0	
Switch output SO2	0.5.2	Output signal DO3/DO4 <O.5.1≠0>	0.5.2-0	
	-0	Off		
	-1	3-step with internal feedback		
	-2	3-step with external feedback		
	0.5.2	Output signal DO3/DO4		
	-3	On-off PWM "+" display		
	-4	On-off PWM "-" display		
	-5	3-step PWM with internal feedback		
	-6	3-step PWM with external feedback		
	SO2.TY	Transit time <O.5.2-1/-5> [10 ... 1000 s]	60 s	
	SO2.TZ	Dead zone <O.5.2≠0> [0.1 ... 100.0 %]	2.0 %	
	SO2.SW	Increment <O.5.2-1/-2> [1 ... 4]	1	
	SO2.P+	Duty cycle (+) signal <O.5.2-3/-4/-5/-6> [1.0 ... 1000.0 s]	10.0 s	
	SO2.P-	Duty cycle (-) signal <O.5.2-5/-6> [1.0 ... 1000.0 s]	10.0 s	

			Default setting	Setting
Switch output SO2	SO2.TMIN+	Minimum on-time (+) signal <0.5.2-3/-4/-5/-6> [0.1 ... 100.0 %]	1.0 %	
	SO2.TMIN-	Minimum on-time (-) signal <0.5.2-5/-6> [0.1 ... 100.0 %]	1.0 %	
	SO2.TMAX+	Maximum on-time (+) signal <0.5.2-3/-4/-5/-6> [0.1 ... 100.0 %]	100.0 %	
	SO2.TMAX-	Maximum on-time (-) signal <0.5.2-5/-6> [0.1 ... 100.0 %]	100.0 %	
	SO2.MIN	Minimum output value <0.5.2≠0> [0.0 ... 100.0 %]	0.0 %	
	SO2.MAX	Maximum output value <0.5.2≠0> [0.0 ... 100.0 %]	100.0 %	
	O.5.3	Operating direction <0.5.1≠0>	0.5.3-1	
	-1	Increasing		
	-2	Decreasing		
	SO2.P1	Y value for SO2=SO2.MIN <0.5.3-1> [0.0 ... 100.0 %] Y value for SO2=SO2.MAX <0.5.3-2> The default value of SO2.P1 is the same as SO2.MIN. If SO2.MIN is changed, SO2.P1 is set to SO2.MIN.	0.0 %	
	SO2.P2	Y value for SO2 = SO2.MAX <0.5.3-1> [0.0 ... 100.0 %] Y value for SO2 = SO2.MIN <0.5.3-2> The default value of SO2.P2 is the same as SO2.MAX. If SO2.MAX is changed, SO2.P2 is set to SO1.MAX.	100.0 %	
	O.5.4	Output ramp <0.5.1≠0>	0.5.4-0	
	-0	Off		
	-1	Start with DI1		
	-2	Start with DI2		
	-3	Start with DI3		
	-4	Start with DI4		
	SO2.GD	Gradient <0.5.4≠0> [0.1 ... 100.0 %]	1.0 %	
	SO2.TB	Time base <0.5.4≠0> [s, min, h]	s	
	SO2.ST	Initial value <0.5.4≠0> [-10.0 ... 110.0 %]	0.0 %	
	O.5.6	Constant output value 1 with DI (auto mode) <0.5.1≠0>	0.5.6-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	SO2.K1	Constant output value 1 <0.5.6≠0> [-10.0 ... 110.0 %]	0.0 %	

			Default setting	Setting
O.5.7	Constant output value 2 with DI (man/auto) <0.5.1≠0>		0.5.7-0	
-0	Off			
-1	With digital input DI1			
-2	With digital input DI2			
-3	With digital input DI3			
-4	With digital input DI4			
SO2.K2	Constant output value 2 <0.5.7≠0> [-10.0 ... 110.0 %]		0.0 %	
O.5.8	Limit output by input TR <0.5.1≠0>		0.5.8-0	
-0	Off			
-1	To minimum value			
-2	To maximum value			
O.5.9	Function generation <0.5.1≠0>		0.5.9-0	
-0	Off			
-1	Free adjustment			
-2	Equal percentage			
-3	Equal percentage inverse			
SO2.I1	Input value 1 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O1	Output value 1 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I2	Input value 2 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O2	Output value 2 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I3	Input value 3 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O3	Output value 3 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I4	Input value 4 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O4	Output value 4 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I5	Input value 5 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O5	Output value 5 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I6	Input value 6 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.O6	Output value 6 <0.5.9-1> [-10.0 ... 110.0 %]		0.0 %	
SO2.I7	Input value 7 <0.5.9-1> [-10.0 ... 110.0 %]		100.0 %	
SO2.O7	Output value 7 <0.5.9-1> [-10.0 ... 110.0 %]		100.0 %	

			Default setting	Setting
Digital output DO1	O.6	Digital output DO1 <O.4.2-0>		
	O.6.1	Assign function	O.6.1-0	
	-0	Off		
	-1	Limit relay Controller [1]		
	-2	Limit relay Controller [2] <M.1-3/-4/-5/-6>		
	-3	With digital input DI1		
	-4	With digital input DI2		
	-5	With digital input DI3		
	-6	With digital input DI4		
	-7	With digital output DO5 <O.10.1≥5>		
	-8	With digital output DO6 <O.11.1≥5>		
	O.6.2	Assign signal <O.6.1≠0>	O.6.2-0	
	-0	Off		
	-1	Input variable PV <C.1.1.1≠0>		
	-2	Input SPE <C.1.2.1≠0>		
	-3	Input DV <C.1.3.1≠0>		
	-4	Input TR <C.1.4.1≠0>		
	-5	Input FB <C.1.5.1≠0>		
	-6	Actual value PV0 <C.1.1.1≠0>		
	-7	Difference PV – SPE <C.1.1.1≠0, C.1.2.1≠0>		
	-8	Difference PV – DV <C.1.1.1≠0, C.1.3.1≠0>		
	-9	Difference SPE – DV <C.1.2.1≠0, C.1.3.1≠0>		
	-10	Error signal e		
	-11	Abs. error signal e		
	-12	Output AO1 <O.1.1≠0>		
	-13	Output AO2 <O.2.1≠0>		
	-14	Output AO3 <O.3.1≠0>		
	-15	Output SO1 <O.4.1≠0>		
	-16	Output SO2 <O.5.1≠0>		
	-17	Actual ratio PVR <M.1-2/-6 Controller [1], O.6.1-1>		
	-18	Difference PV[1] – PV[2] <M.1-3/-4/-5/-6, C.1.1.1≠0, O.6.1-1/-2>		
	O.6.3	Switch function <O.6.2≠0>	O.6.3-0	
	-0	Off		
	-1	Signal under limit		
	-2	Signal over limit		

			Default setting	Setting
Digital output DO1	DO1.LIM	Limit <O.6.3≠0> <O.6.2-1/-2/-3/-4/-5/-6/-17>: [-999.00 ... 9999.00] <O.6.2-7/-8/-9/-18>: [-9999.00 ... 9999.00] <O.6.2-10>: [-110.00 ... 110.00 %] <O.6.2-11>: [0.00 ... 110.00 %] <O.6.2-12/-13/-14/-15/-16>: [-10.00 ... 110.00 %]	0.00	
	DO1.HYS	Hysteresis O.6.2-10/-11/-12/-13/-14/-15/-16: [0.00 ... 9999.00] [0.00 ... 110.00 %]	0.50	
	O.6.4 -0 -1	Inverting <O.6.1≠0> Off On	O.6.4-0	
	O.6.5 -0 -1 -2 -3 -4	Storage <O.6.1≠0> Off Reset with DI1 Reset with DI2 Reset with DI3 Reset with DI4	O.6.5-0	

	O.7	Digital output DO2 <O.4.2-0>		
Digital output DO2	O.7.1 -0 -1 -2 -3 -4 -5 -6 -7 -8	Assign function Off Limit relay Controller [1] Limit relay Controller [2] <M.1-3/-4/-5/-6> With digital input DI1 With digital input DI2 With digital input DI3 With digital input DI4 With digital output DO5 <O.10.1≥5> With digital output DO6 <O.11.1≥5>	O.7.1-0	
	O.7.2 -0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10	Assign signal <O.7.1≠0> Off Input variable PV <C.1.1.1≠0> Input SPE <C.1.2.1≠0> Input DV <C.1.3.1≠0> Input TR <C.1.4.1≠0> Input FB <C.1.5.1≠0> Actual value PV0 <C.1.1.1≠0> Difference PV – SPE <C.1.1.1≠0, C.1.2.1≠0> Difference PV – DV <C.1.1.1≠0, C.1.3.1≠0> Difference SPE – DV <C.1.2.1≠0, C.1.3.1≠0> Error signal e	O.7.2-0	

			Default setting	Setting
Digital output DO2	0.7.2	Assign signal		
	-11	Abs. error signal $ e $		
	-12	Output AO1 $<0.1.1\neq 0>$		
	-13	Output AO2 $<0.2.1\neq 0>$		
	-14	Output AO3 $<0.3.1\neq 0>$		
	-15	Output SO1 $<0.4.1\neq 0>$		
	-16	Output SO2 $<0.5.1\neq 0>$		
	-17	Actual ratio PVR $<M.1-2/-6$ Controller [1], 0.7.1-1/-2>		
	-18	Difference PV[1] – PV[2] $<M.1-3/-4/-5/-6$, C.1.1.1 $\neq 0$, 0.7.1-1/-2>		
Digital output DO2	0.7.3	Switch function $<0.7.2\neq 0>$	0.7.4-0	
	-0	Off		
	-1	Signal under limit		
	-2	Signal over limit		
	DO2.LIM	Limit $<0.7.3\neq 0>$ $<0.7.2-1/-2/-3/-4/-5/-6/-17>$: [-999.00 ... 9999.00] $<0.7.2-7/-8/-9/-18>$: [-9999.00 ... 9999.00] $<0.7.2-10>$: [-110.00 ... 110.00 %] $<0.7.2-11>$: [0.00 ... 110.00 %] $<0.7.2-12/-13/-14/-15/-16>$: [-10.00 ... 110.00 %]	0.00	
	DO2.HYS	Hysteresis 0.7.2-10/-11/-12/-13/-14/-15/-16: [0.00 ... 9999.00] [0.00 ... 110.00 %]	0.50	
Digital output DO2	0.7.4	Inverting $<0.7.1\neq 0>$	0.7.4-0	
	-0	Off		
	-1	On		
	0.7.5	Storage $<0.7.1\neq 0>$	0.7.5-0	
	-0	Off		
	-1	Reset with DI1		
Digital output DO2	-2	Reset with DI2		
	-3	Reset with DI3		
	-4	Reset with DI4		

			Default setting	Setting
Digital output DO3	0.8	Digital output DO3 <0.5.2-0>		
	0.8.1	Assign function	0.8.1-0	
	-0	Off		
	-1	Limit relay Controller [1]		
	-2	Limit relay Controller [2] <M.1-3/-4/-5/-6>		
	-3	With digital input DI1		
	-4	With digital input DI2		
	-5	With digital input DI3		
	-6	With digital input DI4		
	-7	With digital output DO5 <0.10.1≥5>		
	-8	With digital output DO6 <0.11.1≥5>		
	0.8.2	Assign signal <0.8.1≠0>	0.8.2-0	
	-0	Off		
	-1	Input variable PV <C.1.1.1≠0>		
	-2	Input SPE <C.1.2.1≠0>		
	-3	Input DV <C.1.3.1≠0>		
	-4	Input TR <C.1.4.1≠0>		
	-5	Input FB <C.1.5.1≠0>		
	-6	Actual value PV0 <C.1.1.1≠0>		
	-7	Difference PV – SPE <C.1.1.1≠0, C.1.2.1≠0>		
	-8	Difference PV – DV <C.1.1.1≠0, C.1.3.1≠0>		
	-9	Difference SPE – DV <C.1.2.1≠0, C.1.3.1≠0>		
	-10	Error signal e		
	-11	Abs. error signal e		
	-12	Output AO1 <0.1.1≠0>		
	-13	Output AO2 <0.2.1≠0>		
	-14	Output AO3 <0.3.1≠0>		
	-15	Output SO1 <0.4.1≠0>		
	-16	Output SO2 <0.5.1≠0>		
	-17	Actual ratio PVR <M.1-2/-6 Controller [1], 0.8.1-1>		
	-18	Difference PV[1] – PV[2] <M.1-3/-4/-5/-6, C.1.1.1≠0, 0.8.1-1/-2>		

			Default setting	Setting
Digital output DO3	0.8.3	Switch function <0.8.2≠0>	0.8.3-0	
	-0	Off		
	-1	Signal under limit		
	-2	Signal over limit		
	DO3.LIM	Limit <0.8.3≠0> <0.8.2-1/-2/-3/-4/-5/-6/-17>: [-999.00 ... 9999.00] <0.8.2-7/-8/-9/-18>: [-9999.00 ... 9999.00] <0.8.2-10>: [-110.00 ... 110.00 %] <0.8.2-11>: [0.00 ... 110.00 %] <0.8.2-12/-13/-14/-15/-16>: [-10.00 ... 110.00 %]	0.00	
	DO3.HYS	Hysteresis 0.8.2-10/-11/-12/-13/-14/-15/-16: [0.00 ... 9999.00] [0.00 ... 110.00 %]	0.50	
	0.8.4	Inverting <0.8.1≠0>	0.8.4-0	
Digital output DO4	-0	Off		
	-1	On		
	0.8.5	Storage <0.8.1≠0>	0.8.5-0	
	-0	Off		
	-1	Reset with DI1		
	0.8.5	Storage		
	-2	Reset with DI2		
Digital output DO4	-3	Reset with DI3		
	-4	Reset with DI4		
	0.9	Digital output DO4 <0.5.2-0>		
	0.9.1	Assign function	0.9.1-0	
	-0	Off		
	-1	Limit relay Controller [1]		
	-2	Limit relay Controller [2] <M.1-3/-4/-5/-6>		
Digital output DO4	-3	With digital input DI1		
	-4	With digital input DI2		
	-5	With digital input DI3		
	-6	With digital input DI4		
	-7	With digital output DO5 <0.10.1≥5>		
	-8	With digital output DO6 <0.11.1≥5>		

			Default setting	Setting
Digital output DO4	O.9.2	Assign signal <O.9.1≠0>	0.9.2-0	
	-0	Off		
	-1	Input variable PV <C.1.1.1≠0>		
	-2	Input SPE <C.1.2.1≠0>		
	-3	Input DV <C.1.3.1≠0>		
	-4	Input TR <C.1.4.1≠0>		
	-5	Input FB <C.1.5.1≠0>		
	-6	Actual value PV0 <C.1.1.1≠0>		
	-7	Difference PV – SPE <C.1.1.1≠0, C.1.2.1≠0>		
	-8	Difference PV – DV <C.1.1.1≠0, C.1.3.1≠0>		
	-9	Difference SPE – DV <C.1.2.1≠0, C.1.3.1≠0>		
	-10	Error signal e		
	-11	Abs. error signal e		
	-12	Output AO1 <O.1.1≠0>		
	-13	Output AO2 <O.2.1≠0>		
	-14	Output AO3 <O.3.1≠0>		
	-15	Output SO1 <O.4.1≠0>		
	-16	Output SO2 <O.5.1≠0>		
	-17	Actual ratio PVR <M.1-2/-6 Controller [1], O.9.1-1>		
	-18	Difference PV[1] – PV[2] <M.1-3/-4/-5/-6, C.1.1.1≠0, O.9.1-1/-2>		
	O.9.3	Switch function <O.8.2≠0>	0.9.3-0	
	-0	Off		
	-1	Signal under limit		
	-2	Signal over limit		
	DO4.LIM	Limit <O.9.3≠0> <O.9.2-1/-2/-3/-4/-5/-6/-17>: [-999.00 ... 9999.00] <O.9.2-7/-8/-9/-18>: [-9999.00 ... 9999.00] <O.9.2-10>: [-110.00 ... 110.00 %] <O.9.2-11>: [0.00 ... 110.00 %] <O.9.2-12/-13/-14/-15/-16>: [-10.00 ... 110.00 %]	0.00	
	DO4.HYS	Hysteresis O.9.2-10/-11/-12/-13/-14/-15/-16: [0.00 ... 9999.00] [0.00 ... 110.00 %]	0.50	
	O.9.4	Inverting <O.9.1≠0>	0.9.4-0	
	-0	Off		
	-1	On		

			Default setting	Setting
Digital output DO4	O.9.5	Storage <O.9.1≠0>	O.9.5-0	
	-0	Off		
	-1	Reset with DI1		
	-2	Reset with DI2		
	-3	Reset with DI3		
	-4	Reset with DI4		
Digital output DO5	O.10	Digital output DO5		
	O.10.1	Assign function	O.10.1-0	
	-0	Off		
	-1	Digital input DI1 active		
	-2	Digital input DI2 active		
	-3	Digital input DI3 active		
	-4	Digital input DI4 active		
	-5	Sensor/signal error <I.1.5≠0/I.2.5≠0/I.3.5≠0/I.4.5≠0>		
	-6	Communication failure <D.1.1-1>		
	-7	Cascade opened <M.1-3>		
	-8	[1] Automatic mode		
	-9	[1] Manual mode		
	-10	[1] External set point active <1C.2.1.2≠0>		
	-11	[1] External output value active <1C.3.3.3≠0>		
	-12	[2] Automatic mode <M.1-3/-4/-5/-6>		
	-13	[2] Manual mode <M.1-3/-4/-5/-6>		
	-14	[2] External set point active <M.1-3/-4/-5/-6, 2C.2.1.2≠0>		
	-15	[2] External output value active <M.1-3/-4/-5/-6, 2C.3.3.3≠0>		
	-16	3-step SO1+ instead of DO1 <O.4.1-1/-2/-5/-6>		
	-17	3-step SO2+ instead of DO3 <O.5.1-1/-2/-5/-6>		
	-18	On-off SO1+ instead of DO1 <O.4.1-3/-4>		
	O.10.2	Inverting <O.10.1≠0>	O.10.2-0	
	-0	On		
	-1	Off		

Digital output DO5	O.11.1	Digital output DO6		
	O.11.1.1	Assign function	O.11.1-0	
	-0	Off		
	-1	Digital input DI1 active		
	-2	Digital input DI2 active		
	-3	Digital input DI3 active		
	-4	Digital input DI4 active		
	-5	Sensor/signal error <I.1.5≠0/I.2.5≠0/I.3.5≠0/I.4.5≠0>		
	-6	Communication failure <D.1.1-1>		
	-7	Cascade opened <M.1-3>		
	-8	[1] Automatic mode		
	-9	[1] Manual mode		
	-10	[1] External set point active <1C.2.1.2≠0>		
	-11	[1] External output value active <1C.3.3.3≠0>		
	-12	[2] Automatic mode <M.1-3/-4/-5/-6>		
	-13	[2] Manual mode <M.1-3/-4/-5/-6>		
	-14	[2] External set point active <M.1-3/-4/-5/-6, 2C.2.1.2≠0>		
	-15	[2] External output value active <M.1-3/-4/-5/-6, 2C.3.3.3≠0>		
	-16	3-step SO1- instead of DO2 <O.4.1-1/-2/-5/-6>		
	-17	3-step SO2- instead of DO4 <O.5.1-1/-2/-5/-6>		
	-18	On-off SO1+ instead of DO3 <O.4.1-3/-4>		
	O.11.2	Inverting <O.11.1≠0>	O.11.2-0	
	-0	Off		
	-1	On		
	O.12	Digital output DO7		
	O.12.2	Inverting	O.12.2-0	
	-0	Off		
	-1	On		

D Communication

NOTICE				Default setting	Setting
The settings of configuration items D.2.1 and D.3.1 are only effective with the corresponding interface board. See section 14.5.					
	D.1	General settings			
	D.1.1	Communication monitoring		D.1.1-0	
	-0	Off			
	-1	On			
	QRY.TOUT	Query timeout <D.1.1-1>	[1 ... 9999 s]	60 s	
	D.2	RS-232 interface			
RS-232 interface	D.2.1	Protocol		D.2.1-1	
	-0	Off			
	-1	Automatic (9600, 8, N, 1)			
	-2	SSP (9600, 8, N, 1)			
	-3	Modbus RTU			
	STN	Station number <D.2.1-3>	[1 ... 255]	1	
	BITRATE	Modbus Baud rate <D.2.1-3>	[300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s]	9600 bit/s	
	PARITY	Parity <D.2.1-3>	[0 = none, 1 = even, 2 = odd]	0 = none	
	STOPBIT	Stop bit <D.2.1-3>	1, 2	1	
	RSP.TOUT	Response timeout <D.2.1-3>	0.1 ... 100.0 s	10.0 s	
	D.3	RS-485 interface			
RS-485 interface	D.3.1	Protocol		D.3.1-1	
	-0	Off			
	-1	Automatic (9600, 8, N, 1)			
	-2	SSP (9600, 8, N, 1)			
	-3	Modbus RTU			
	STN	Station number <D.3.1-3>	[1 ... 255]	1	
	BITRATE	Modbus Baud rate <D.3.1-3>	[300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s]	9600 bit/s	
	PARITY	Parity <D.3.1-3>	[0 = none, 1 = even, 2 = odd]	0	
	STOPBIT	Stop bit <D.3.1-3>	1, 2	1	
	RSP.TOUT	Response timeout <D.3.1-3>	0.1 ... 100.0 s	10.0 s	

			Default setting	Setting
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A General settings

			Default setting	Setting
	A.1	Language/Sprache		
	A.1.1	Auswahl / Selection		
	-1	Deutsch		
	-2	English		
	-3	Français		

	A.2	Operation display		
Operation display	A.2.1	Left display	A.2.1-1	
	-0	Off <A.2.2≠0>		
	-1	Controller [1]		
	-2	Controller [1] additional reading		
	-3	Controller [2] <M.1-3/-4/-5/-6>		
	-4	Controller [2] additional reading <M.1-3/-4/-5/-6>		
	A.2.2	Right display	A.2.2-0	
	-0	Off <A.2.1≠0>		
	-1	Controller [1]		
	-2	Controller [1] additional reading		
	-3	Controller [2] <M.1-3/-4/-5/-6>		
	-4	Controller [2] additional reading <M.1-3/-4/-5/-6>		
	A.2.3	Contrast		
	CTRST	Contrast [0 ... 100]	50	

	A.3	Operator keys		
Operator keys	A.3.1	Lock all keys	A.3.1-0	
	-0	Off		
	-1	With digital input DI1		
	-2	With digital input DI2		
	-3	With digital input DI3		
	-4	With digital input DI4		
	A.3.2	Manual/automatic dialog	A.3.2-0	
	-0	Off		
	-1	On		

			Default setting	Setting
	A.4	Key number		
	A.4.1	Key number operation	A.4.1-0	
	-0	Off		
	-1	On		
	CODE	Key number <A.4.1-1 > [0 ... 9999]	0	
	A.5	Power frequency		
	A.5.1	Ripple filter for AI	A.5.1-1	
	-1	50 Hz		
	-2	60 Hz		
	A.20	User adjustment (calibration)		
	A.20.1	Analog input AI1		
Analog input AI1	A.20.1.1	Current zero (4 mA) <I.1.1-1>		
	A.20.1.2	Current end (20 mA) <I.1.1-1>		
	A.20.1.3	Current zero (0 mA) <I.1.1-2>		
	A.20.1.4	Current end (20 mA) <I.1.1-2>		
	A.20.1.5	Voltage zero (0 V) <I.1.1-3>		
	A.20.1.6	Voltage end (10 V) <I.1.1-3>		
	A.20.1.7	Voltage zero (2 V) <I.1.1-4>		
	A.20.1.8	Voltage end (10 V) <I.1.1-4>		
	A.20.1.9	Pt 100 zero (0 °C) <I.1.1-6>		
	A.20.1.10	Pt 100 end (300 °C) <I.1.1-6>		
	A.20.1.11	Pt 1000 zero (0 °C) <I.1.1-7>		
	A.20.1.12	Pt 1000 end (300 °C) <I.1.1-7>		
	A.20.2	Analog input AI2		
Analog input AI2	A.20.2.1	Current zero (4 mA) <I.2.1-1>		
	A.20.2.2	Current end (20 mA) <I.2.1-1>		
	A.20.2.3	Current zero (0 mA) <I.2.1-2>		
	A.20.2.4	Current end (20 mA) <I.2.1-2>		
	A.20.2.5	Voltage zero (0 V) <I.2.1-3>		

			Default setting	Setting
Analog input AI2	A.20.2.6	Voltage end (10 V) <I.2.1-3>		
	A.20.2.7	Voltage zero (2 V) <I.2.1-4>		
	A.20.2.8	Voltage end (10 V) <I.2.1-4>		
	A.20.2.9	Pt 100 zero (0 °C) <I.2.1-6>		
	A.20.2.10	Pt 100 end (300 °C) <I.2.1-6>		
	A.20.2.11	Pt 1000 zero (0 °C) <I.2.1-7>		
	A.20.2.12	Pt 1000 end (300 °C) <I.2.1-7>		
	A.20.2.13	Potentiometer zero <I.2.1-8/-9/-10/-11>		
	A.20.2.14	Potentiometer end <I.2.1-8/-9/-10/-11>		

	A.20.3	Analog input AI3		
Analog input AI3	A.20.3.1	Current zero (4 mA) <I.3.1-1>		
	A.20.3.2	Current end (20 mA) <I.3.1-1>		
	A.20.3.3	Current zero (0 mA) <I.3.1-2>		
	A.20.3.4	Current end (20 mA) <I.3.1-2>		
	A.20.3.5	Voltage zero (0 V) <I.3.1-3>		
	A.20.3.6	Voltage end (10 V) <I.3.1-3>		
	A.20.3.7	Voltage zero (2 V) <I.3.1-4>		
	A.20.3.8	Voltage end (10 V) <I.3.1-4>		
	A.20.3.9	Pt 100 zero (0 °C) <I.3.1-6>		
	A.20.3.10	Pt 100 end (300 °C) <I.3.1-6>		
	A.20.3.11	Pt 1000 zero (0 °C) <I.3.1-7>		
	A.20.3.12	Pt 1000 end (300 °C) <I.3.1-7>		

	A.20.4	Analog input AI4		
Analog input AI4	A.20.4.1	Current zero (4 mA) <I.4.1-1>		
	A.20.4.2	Current end (20 mA) <I.4.1-1>		
	A.20.4.3	Current zero (0 mA) <I.4.1-2>		
	A.20.4.4	Current end (20 mA) <I.4.1-2>		
	A.20.4.5	Voltage zero (0 V) <I.4.1-3>		

			Default setting	Setting
Analog input AI4	A.20.4.6	Voltage end (10 V) <I.4.1-3>		
	A.20.4.7	Voltage zero (2 V) <I.4.1-4>		
	A.20.4.8	Voltage end (10 V) <I.4.1-4>		
	A.20.4.9	Pt 100 zero (0 °C) <I.4.1-6>		
	A.20.4.10	Pt 100 end (300 °C) <I.4.1-6>		
	A.20.4.11	Pt 1000 zero (0 °C) <I.4.1-7>		
	A.20.4.12	Pt 1000 end (300 °C) <I.4.1-7>		
	A.20.5	Analog output AO1		
	A.20.5.1	Current zero (0 mA) <O.1.2-2> · (4 mA) <O.1.2-1>		
	A.20.5.2	Current end (20 mA) <O.1.2-1/-2>		
	A.20.5.3	Voltage zero (0 V) <O.1.2-3> · (2 V) <O.1.2-4>		
	A.20.5.4	Voltage end (10 V) <O.1.2-3/-4>		
	A.20.6	Analog output AO2		
	A.20.6.1	Current zero (0 mA) <O.2.2-2> · (4 mA) <O.2.2-1>		
	A.20.6.2	Current end (20 mA) <O.2.2-1/-2>		
	A.20.6.3	Voltage zero (0 V) <O.2.2-3> · (2 V) <O.2.2-4>		
	A.20.6.4	Voltage end (10 V) <O.2.2-3/-4>		
	A.20.7	Analog output AO3		
	A.20.7.1	Current zero (0 mA) <O.3.2-2> · (4 mA) <O.3.2-1>		
	A.20.7.2	Current end (20 mA) <O.3.2-1/-2>		
	A.20.7.3	Voltage zero (0 V) <O.3.2-3> · (2 V) <O.3.2-4>		
	A.20.7.4	Voltage end (10 V) <O.3.2-3/-4>		
	A.21	Factory defaults		
	A.21.1	Reset controller	A.21.1-0	
	-0	Off		
	-1	All except calibration		
	-2	Only user calibration		

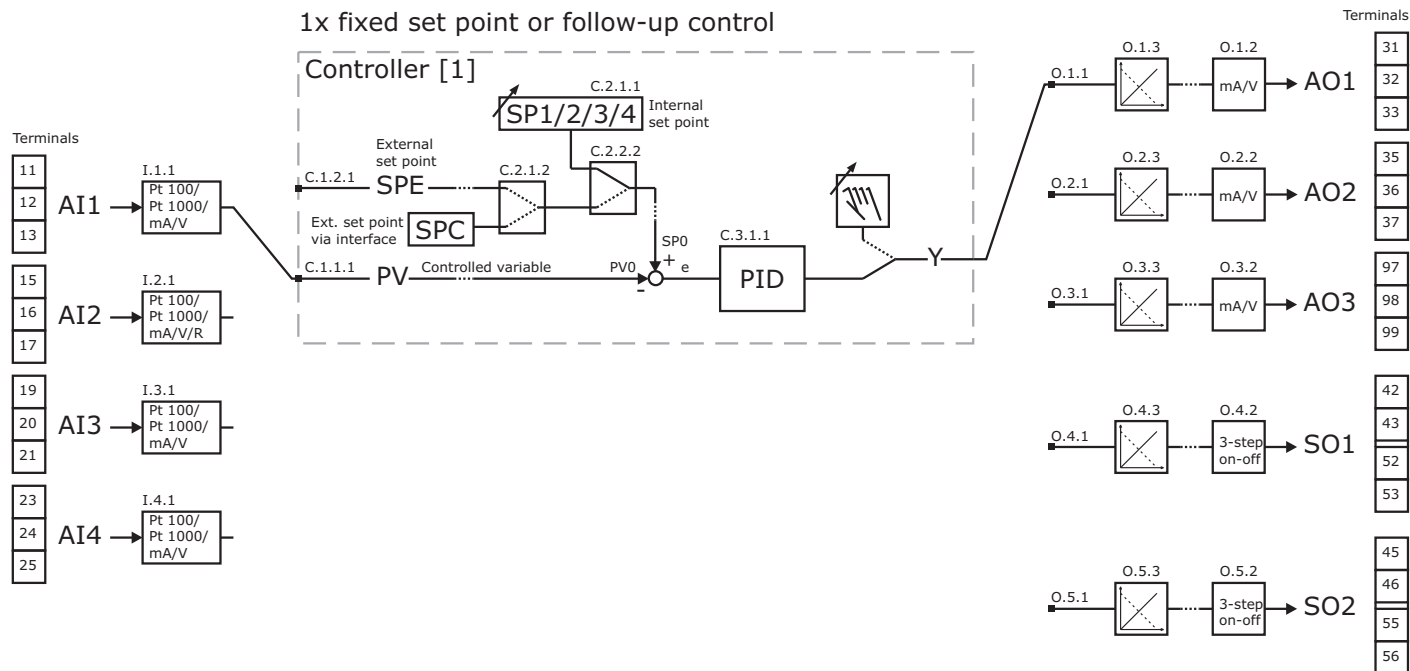
14.3 Abbreviations used

AI	Analog input	SP0	Set point at comparator
AO	Analog output	SPC	Set point via interface
DI	Digital input	SPE	External set point, auxiliary variable, disturbance variable
DO	Digital output	SPM	Set point of slave controller (cascade control)
DV	Auxiliary variable, disturbance variable or leading process variable in ratio control	SPR	Set point ratio
e	Error signal	TN	Reset time
FB	Feedback	TR	Input variable for output tracking, auxiliary variable, disturbance variable
KP	Proportional-action coefficient	TRC	Output tracking via interface
PV	Process value	TV	Derivative-action time
PV0	Actual value at comparator	TV.K	Derivative-action gain
PVR	Actual ratio	Y	Manipulated variable
PWM	Pulse width modulation	Y0	Operating point
SO	Switch output	YM	Output variable of master controller (cascade control)
SP	Set point		
SP1...4	Set point 1...4		
SPI	Internal set point		

14.4 Block diagrams

Simplified block diagrams are shown for each control mode on the following pages. The Configuration Manual KH 6495-2 EN contains detailed block diagrams.

M.1-1 1x fixed set point or follow-up control



Ratio controller [1]

Ratio formula C.2.1.3-1

$$\text{Ratio} = \frac{PV}{DV} * K11$$

External ratio set point C.1.2.1 SPE

Ext. set point via interface SPC

C.1.3.1 DV Leading process variable

C.1.1.1 PV Controlled variable

C.2.1.1 SP1/2/3/4 Internal ratio set point

C.2.1.2

Ratio set point SPR

Actual ratio PVR

Actual value PV0

C.3.1.1 Set point SP0

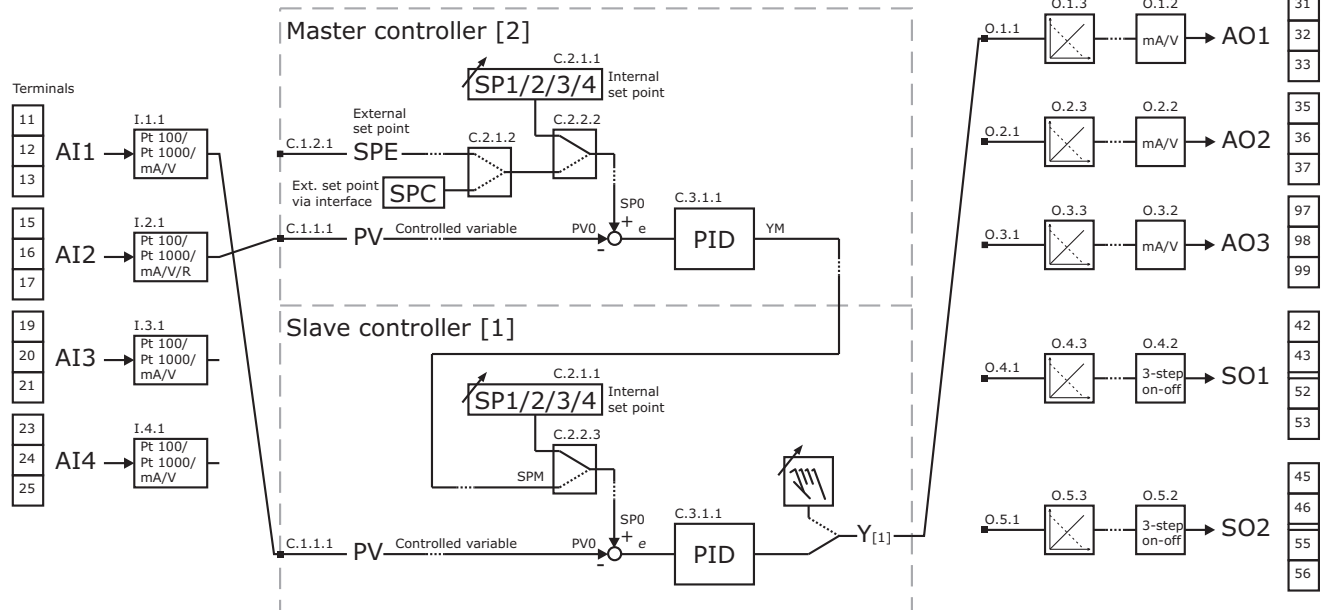
PID

Y

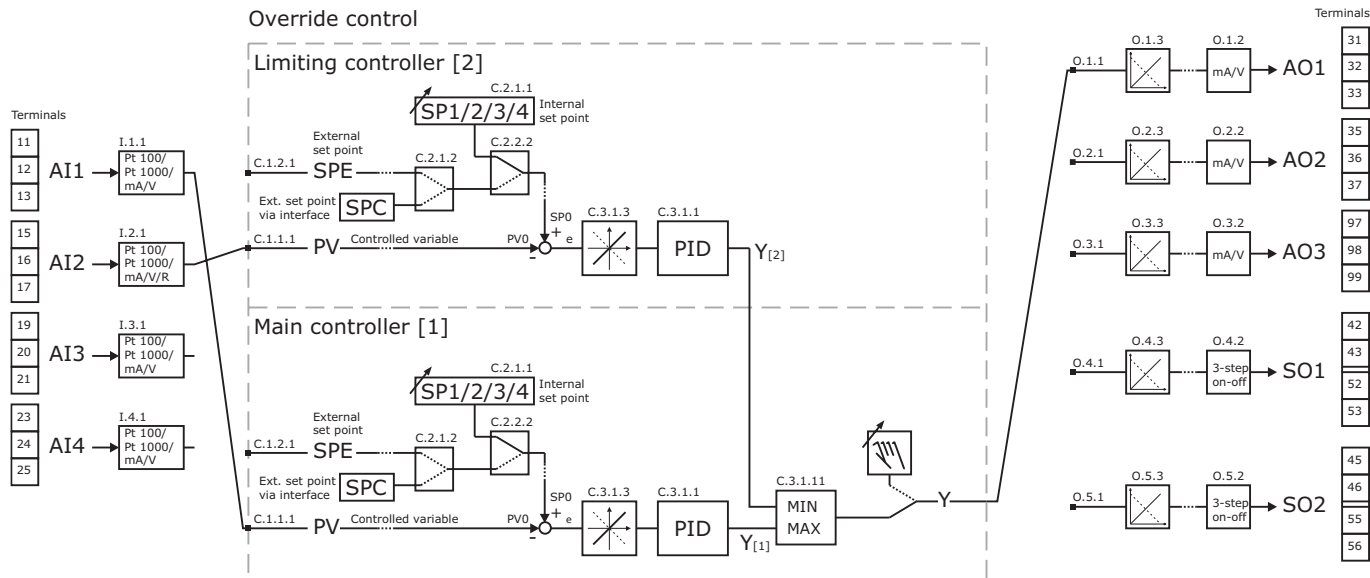
K11



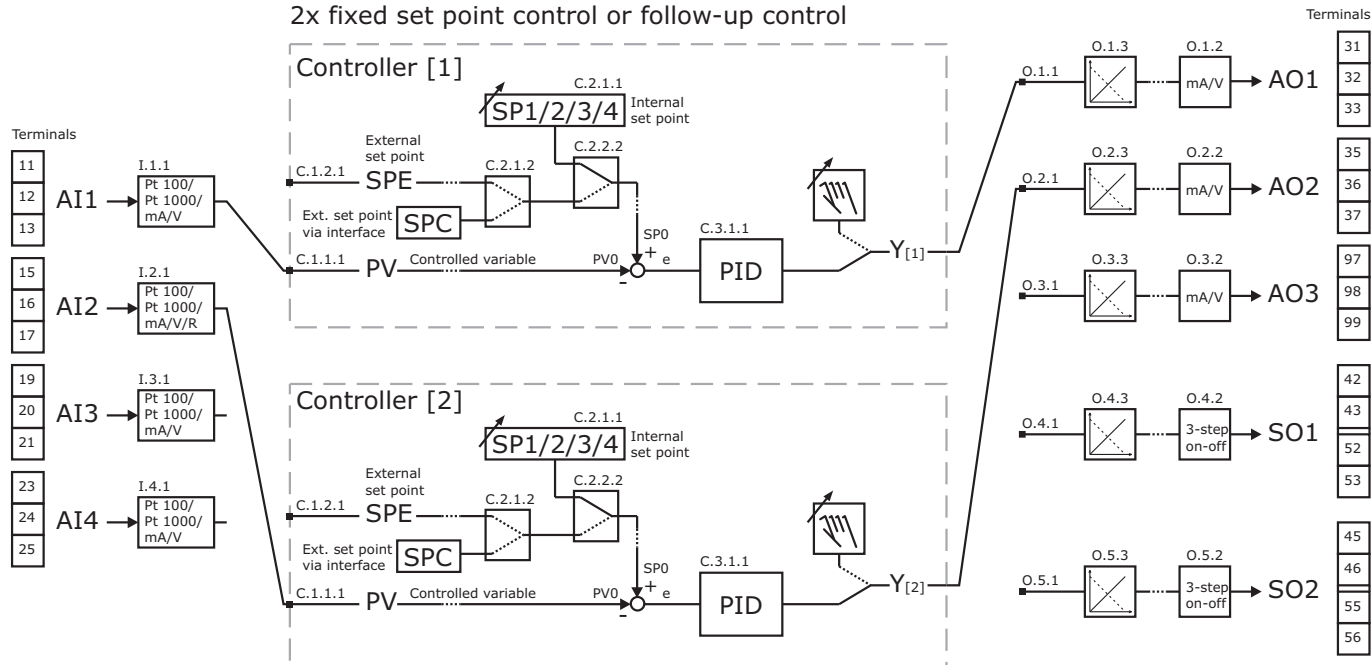
M.1-3 Cascade control



M.1-4 Override control

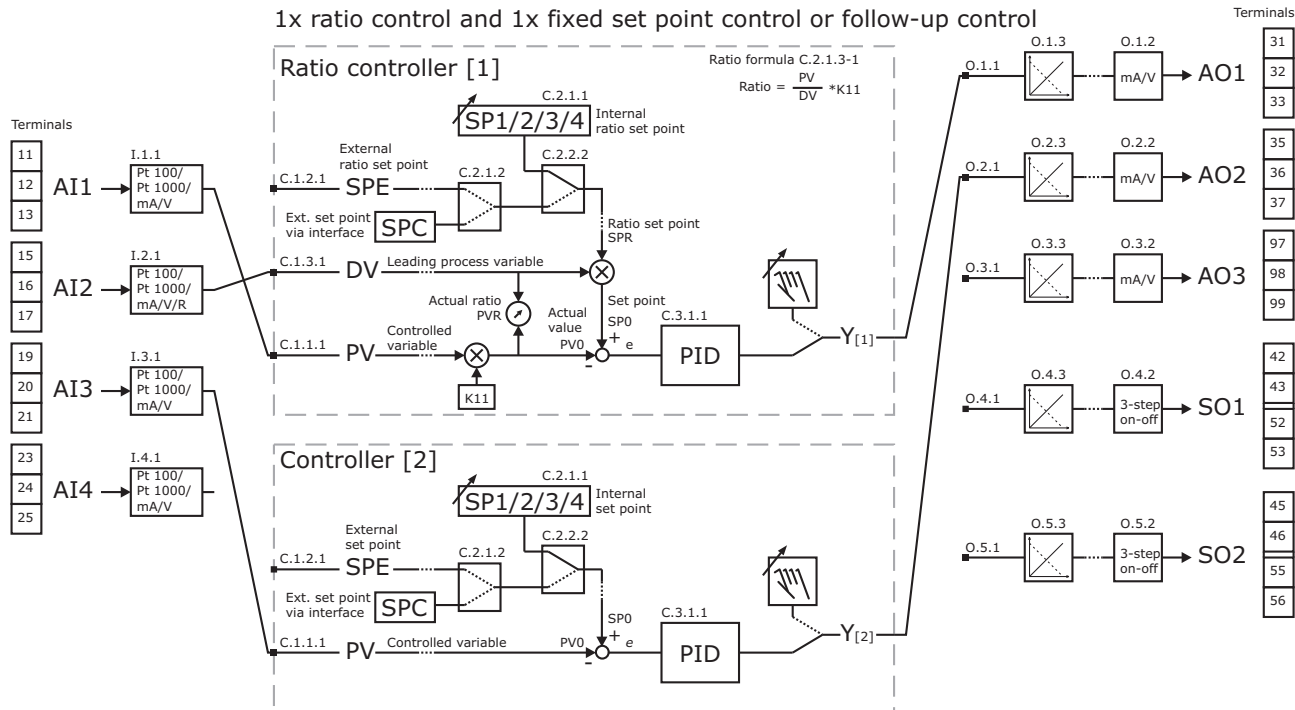


M.1-5 2x fixed set point control or follow-up control



M.1-6

1x ratio control and 1x fixed set point control or follow-up control



Note: Further ratio formulas are can be selected for ratio controller [1].

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EB 6495-2 EN

2015-03